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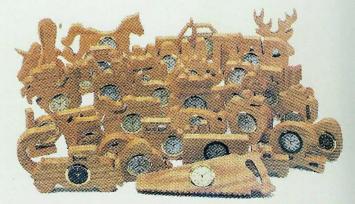


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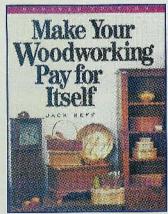
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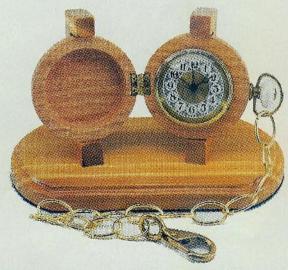
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CONTENTS



Fence Post Vase	

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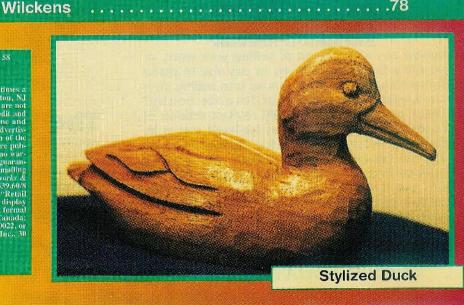
A commence of the second			
· Court	Lion Key Rack 6		
	Autumn Leaf Magnets8		
	Ringneck Pheasant12		
	Forstner Bit Cube18		
WILLIAM	Autumn Leaves Wreath22		
	Dragon Silhouette32		
	Following In Papa's		
	Footprints68		
ten Võ	Carving Section:		
	Country Lane70		
	Stylized Duck72		
Element Web	Bonus Project: Quanah Parker		
	Silhouette		
	Carving Section con't:		
and the second second	Nosy Cat76		
	Carousel Silhouette81		
Halloween Puzzle			
Four Alabaster Projects85			
1903 Wright Flyer .			
FEATURE			
	ections with metric conversions:		
	From Raymond and Dan		
Joinening Special	Trom naymona and ban		

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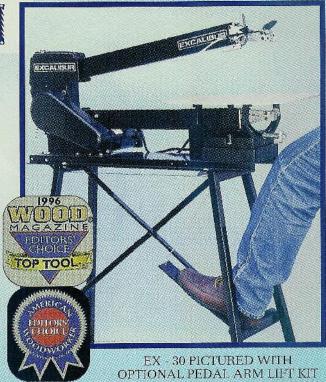
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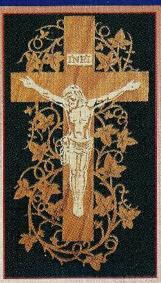
5 Angel Patterns For The Price Of One!

This glorious host of angels includes the famous "Peace Angels" (left) and 4 more angels (below)! Pattern No. AF-82 \$4.00



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"WOLF" \$3.00 Pattern No. AF-21 Lion Key Rack

by John A. Nelson



SUPPLIES

Wood: wood of choice—3/4" x 8-1/2" x 13"

Tools: scroll saw with No. 7 blades; drill with bits including a 1/2"-Dia. bit (for the pegs)

Temporary-bond spray adhesive

Sandpaper, assorted grits

Six 1/2"-Dia. wooden pegs

Wood glue

Finish of choice

Sawtooth hanger

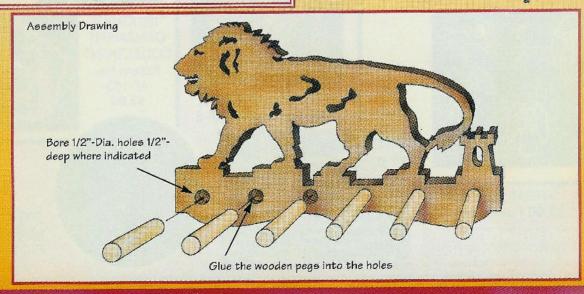
Take a scroll saw seminar with John Nelson at The ULTIMATE Woodcrafting Festival, August 21-23, 1998!

INSTRUCTIONS

Attach the pattern, found in Full Size Pattern Section No. 1, to the wood with temporary-bond spray adhesive. Drill holes for the pegs and the interior cuts. Next, starting from the center, saw the pattern to shape.

Remove the pattern and sand as needed. Glue the pegs into the holes with wood glue and allow to dry thoroughly (see the Assembly Drawing). Next, apply finish of choice. When dry, attach a sawtooth hanger to the back.

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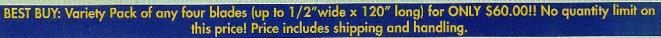
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Autumn Leaf Magnets

by Robert J. Hlavacek, Sr.



SUPPLIES

Wood: 1/8"-thick Baltic birch plywood (size is dependent upon leaves chosen)
Tools: scroll saw with No. 2/0, 0, or 1 blades; drill with No. 60 bit; wire cutters
Permanent-bond spray adhesive
26-gauge floral stem wire
Brown floral tape
3/4"-Dia. magnets (one for each leaf)

3/4"-Dia. magnets (one for each leaf)
Cyanoacrylate glue (medium thickness)
Acrylic paint in Dark Brown
Krylon No. 1311 matte spray finish
Wax paper

For a FREE catalog filled with Bob Hlavacek's award-winning intarsia designs, contact Wildlife Intarsia Designs, P.O. Box 1246, North Riverside, IL 60546-0646, (708) 788-6455 and see Bob Hlavacek in action in the RBIndustries booth at The ULTIMATE Woodcrafting Festival!



Fig. 1. Spray permanent-bond spray adhesive to the plywood and the leaf.



Fig. 2. Place wax paper over the leaf and plywood and press down firmly.



Fig. 3. Drill a hole for the stem with a No. 60 bit.

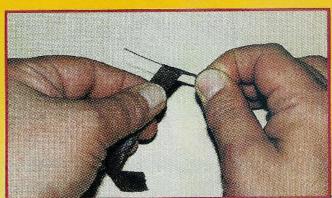


Fig. 4. Wrap the wire with floral tape.

INSTRUCTIONS Fun for fall

This year when the leaves start to change colors, take the kids on a treasure hunt and collect the materials for some unique, easy, and fun to make scroll saw projects.

Look for the most colorful, fresh leaves you can find. Avoid those that are curling and getting brittle. Press the leaves flat for a month or so, until they are dry. An old, thick telephone book works well for this. If you have a thin phone book, put a board and brick on top of it. The flatter you can press the leaves, the better your results will be.

Now get all your supplies together and have some fun!

Cut out the leaves

Rough cut the 1/8" plywood for each leaf. Place plenty of newspaper down on your work table and spray a moderately heavy coat of permanent-bond spray adhesive on the plywood. Note: be sure to read and follow all manufacturer's warnings on the can. Holding a leaf by its stem, apply some adhesive to the back side (see Fig. 1). Don't worry about getting glue on the stem as it will be cut off later—we're only using it as a handle for now.

Let the adhesive dry for a minute or two, then position the leaf on the plywood. Place a piece of wax paper over top and press down firmly to insure a good bond, as shown in Fig. 2.

When you remove the wax paper, the adhesive on the plywood will still be sticky. To rectify this, apply two or three light coats of matte spray finish to the wood. The finish will seal the glue so that it is no longer sticky, and will finish the leaf at the same time. Next, use a sharp knife to cut off the stem.

Cut out the leaf. Don't worry about following the exact outline of the leaf—the finished project looks better if you make the cut slightly into the leaf so that the plywood doesn't show.

Next, carefully drill a hole with a No. 60 bit approximately 1/4"-deep straight into the edge of the plywood (see Fig. 3) for the wire stem.



Paint the back and edges of the plywood with thinned Dark Brown. Since the surface of the leaf has already been finished, any paint that gets on the surface can be wiped off without marring the leaf. Set the leaf aside to dry.

Clip off about two inches of floral wire and wrap it with floral tape, starting from the tip of the stem and working up toward the leaf end. Do not cover the wire where it will be glued into the plywood. Although floral tape isn't sticky, when wrapped and twisted around itself and the wire it holds tight, making a good imitation stem (see Fig. 4).

Place a drop of cyanoacrylate glue on the wire and insert it in the hole. Glue a magnet on the back, then enjoy the colors of autumn all year long!

Publisher Jerry Cohen CEO Darren S. Cohen

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Scrolling Editors Dirk Boelman

& Marketing Marie-Claire Macdonald Editorial Director Robert A. Becker Editor George Ahlers Associate Editor Barbara d. Martin

Roy King Scott Kochendorfer John A. Nelson

Painting Editor Joanne Lockwood Carving Editor Ivan Whillock Intarsia Editor Robert J. Hlavacek, Sr. New Products Editor Jacob Schulzinger Techniques Editor Joseph M. Herrmann Art Director Kelly Albertson Desktop Coordinator Kathy Morawski Graphic Designers Samantha M. Constant

Jennifer J. Wilhelmy Kate Gubernard Photographer Andy Chen

2nd Photographer Anthony Spirito Illustrator Robert Borkowski Proofreader Sarah Mathers-Weaver Public Relations Madeline S. Cohen Reader Service Tammy Levan (973) 383-8080

In House Advertising Lee Jaworski (973) 383-1215

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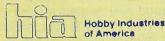
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The Greatest Weekend In Wood

Creative Woodworks & Crafts Editor, George Ahlers, is busy planning his AirPainter seminars for The ULTIMATE Woodcrafting Festival. So for this issue, he has temporarily passed the editorial page torch on to Associate Editor (and Festival Director) Barbara d. Martin. Here, she tells you what you can look forward to this August 21, 22, and 23...



Come spend the perfect weekend

You drive into the Sussex County Fairgrounds at 11:45 on Friday, August 20, filled with anticipation. After parking, you step out into the fresh country air. In one hand, you have your discounted pre-registration ticket. In the other is that special project you put the finishing touches on just days before. You look around and see hundreds of woodcrafters just like yourself heading toward the tents and buildings that are filled to the brim with not only your favorite designers, but with all those tools, kits, patterns, books and supplies that you've been waiting to try out firsthand.

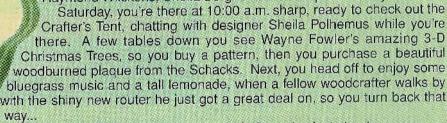
You hand over your ticket and enter the event for which you've waited all summer long—The ULTIMATE Woodcrafting Festival!

So much to do in just three short days!

First, you drop off your project at the Reader's Gallery Tent, where you also register to win an entire 62-issue Creative Woodworks & Crafts back issue collectionone of only four in existence (at least to our knowledge!). Next, you head over to the seminar building to check out the schedule, making some new friends along the way. With teachers like John Nelson, Ivan Whillock, Roy King and Scott Kochendorfer, Garnet Hall, and Joe Herrmann...you could spend a week in this one building alone! "Hey, is that Joanne Lockwood teaching in the Quick & Easy Painting class area? I'd better go sign up!"

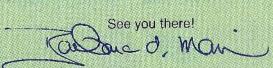
You stroll up and down the aisles, buy a August 21-23, few patterns, ask lots of questions, see

some amazing demonstrations, meet Bob Hlavacek, Dan and Raymond Wilckens, Sheila Bergner...is it 6:00 p.m. already?



It's already Sunday, and you can't believe the last day has come so quickly. Today, you're going to check out The Great Fretwork Clock and finally meet Dirk and Karen Boelman-you've been buying their patterns for years! On the way, you stop and watch a few more scroll saw demonstrations, easily talk yourself into buying a new set of carving tools, and then treat yourself to a T-shirt, cap and mug to help remember this weekend by.

It's almost 4:00 p.m., so you wish your newfound friends a safe journey home and pat yourself on the back for making it to what turned out to be the greatest weekend in wood-The ULTIMATE Woodcrafting Festival!



The ULTIMATE Woodcrafting Festival





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Ringneck Pheasant

by Robert J. Hlavacek, Sr.



SUPPLIES

Wood: birch—3/4" x 4" x 6" (for the head and beak); western red cedar—3/4"-thick (specific board sizes are not listed since you may not be able to find the proper grain pattern and color in one board)

Tools: scroll saw with No. 5 reverse tooth blades; drill press with auxiliary table and assorted sanding drums with 100 grit sleeves, flutter wheel** with 100 and 180 grit abrasive sheets, and 3/8"-Dia. drill bit; finish sander

One 9mm glass eye in Orange, No. T1SP (Color 314)*

Bellows type glue applicator*** and carpenter's glue

Wax paper

Masking tape

5-minute epoxy

White graphite paper****

Accent Country Colors acrylic paints:

Baroque Pearl; Black; Pine Needle Green; Red

Krylon No. 1311 matte finish Sawtooth hanger

*Available from Van Dyke's, (800) 843-3320. **Available from The Sanding Catalogue,

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***Available from Woodcraft Supply, call (800) 535-4482 for a free catalog.

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For a FREE catalog filled with Robert J. Hlavacek's award-winning intarsia patterns, contact Wildlife Intarsia Designs at (708) 788-6455, P.O. Box 1246, North Riverside, IL 60546-0646.

INSTRUCTIONS

Trace, cut, and fit

The first thing you'll need to do is to select the wood for your pheasant. Look for boards with knots over 2"-Dia. for the best grain configuration. **Note:** the head, from the white neck ring to the beak, is sawn from one piece of wood.

Trace the pattern, found in Full Size Pattern Section No. 1, onto the wood. White graphite paper works best to provide an easy-to-follow cut line as shown on the right wing in Fig. 1. Do not cut off the excess wood at the ends of the feathers at this time.

Tape the feathers together on both sides to hold them firmly in place. Position the upper portion of the wing on top of the feathers, then trace a new cut line (see Fig. 2).

Following this method of cutting and taping the pieces together lets you cut twelve individual feathers as easily as one, as shown in Fig. 3. Don't forget to put masking tape on both the front and back sides to hold the pieces rigid. Also, notice the advantage of using white graphite paper for transferring the pattern to the wood. The new pencil line traced around the upper portion of the wing in Fig. 2 is easily distinguishable from the originally traced white line, providing a new easy-to-follow cut line. Cut just to the outside edge of the pencil line and use your drill press with an auxiliary table (see the August 1997 issue of *Creative Woodworks & Crafts* for complete instructions) and sanding drums to smooth out any irregularities in the cut edge (see Fig. 4).

The twelve feathers are now fitted to the upper section of the wing, again leaving extra material on the left side of the unit where the wing joins the body, as shown in **Fig. 5**.

After taping the twelve feathers to the three pieces of the upper wing, all fifteen pieces can be fitted to the body as easily as one piece after cutting and a little sanding for a

precise fit (see Fig. 6).

As shown in Fig. 7, I've kept cutting, fitting, and taping the pieces together until they've all been cut out. Again, take note of the fact that extra material was left on the ends of the tail feathers so that a new cut line can be traced from the body to the entire tail which can then be fitted as easily as one piece.



Once all of the pieces have been cut out and fitted, remove the wings and tail units from the body. Do not take the tape off the wing units at this time because some contouring can be done first. Having tape on both sides holds the feathers of the right wing rigid enough to contour the edges on all of them at one time (see **Fig. 8**).

Next, remove the tape and contour the individual feathers. The leading edge of each feather should be approximately 1/32" to 1/16" higher than the trailing edge to create the illusion of overlapping. Refer to Drawings No. 1, 2, and 3 (at the top of page 16), as well as the photos throughout the article, for contouring details.

After contouring, use the flutter wheel to smooth the



Fig. 1. White transfer paper makes the cut lines much easier to follow.

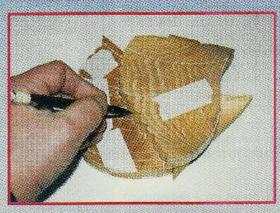


Fig. 2.
Using the upper portion of the wing as a guide, trace a new cut line for the feathers.

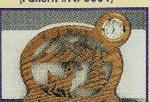
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Painting

Paint the pheasant's head by thinning the acrylic paint with water so that it stains to wood instead of actually looking like a coat of paint. Add a drop or two of Black to the Red for painting the face. The beak is the natural color of the birch.

Since the water-thinned paint will raise the wood grain, you'll have to "defuzz" it when it dries. Using a flutter wheel assembly in the drill press running at about 700 r.p.m. will quickly do the job. The Black mark below the eye is painted with unthinned paint to prevent running.

Gluing

Spread wax paper on a flat surface and edge glue the pieces together. The bellows type glue applicator pictured in Fig. 10 affords excellent control for dispensing glue. Avoid using too much glue to prevent any squeeze out from marring the surface of your project.

When gluing your pheasant together, don't dawdle. Carpenter's glue sets up pretty fast and you want to be sure that all the pieces will line up properly.

Finishing

After removing the glued-up pheasant from the wax paper, sand the back side with your finish sander. Apply two or three coats of finish to the back of the project. Using a turntable, as pictured in Fig. 11, makes it easy to cover all sides. Note: check out the contouring details on the back side of the wings and tail feathers.

Apply three to four coats of finish to the front of the pheasant followed by a light sanding with 400 grit abrasive. Next, spray on the final coat of finish.

Use 5-minute epoxy to glue the eye in place. Attach a sawtooth hanger to the back and proudly display your pheasant (out of the reach of your dog!).

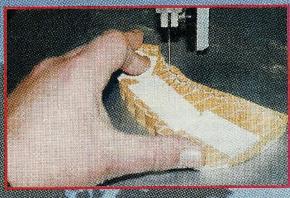


Fig. 3. Taping the individual pieces together before cutting allows twelve pieces to be cut as one.

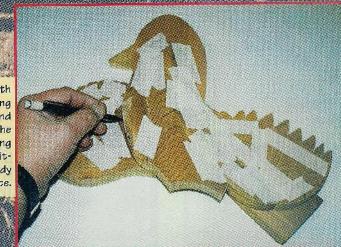
Fig. 4. Smooth out any irregularities left from cutting out the feathers. The wing is sanded with a 1/4" sanding drum, turn to page 16 for details on how to make one yourselfl





Fig. 5. Joining the wing pieces. Note the extra material on the bottom left section where the wing assembly will join the body.

Fig. 6. With careful cutting and sanding (and a lot of tape), the fifteen wing pieces can be fitted to the body as one piece.



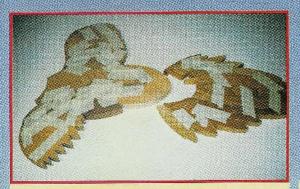


Fig. 7. Assembling the project. Again note the extra material left on the ends of the tail feathers.



Fig. 8. By taping both the top and bottom of the wing piece, the feathers are held in place for contouring.



Fig. 9. A flutter wheel will texture the wood, creating a more realistic looking project.

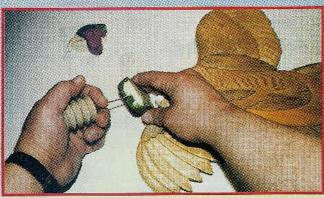


Fig. 10. A bellows type glue dispenser will allow you perfect control when gluing your project together.



Fig. 11. Using a turntable makes easy work of finishing your project evenly and completely.

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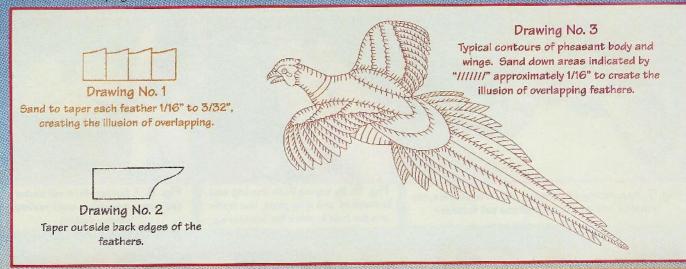
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SUPPLIES

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One 1/4"-Dia, x 12"-long threaded rod

Nine 1/4" hex nuts

1/4"-Dia. x 5-3/4"-long 100 grit sanding sleeves*

*To order 100 grit, 1/4"-Dia. x 5-3/4" sanding sleeves (Item No. SS45305) contact the Sanding Catalogue at (800) 228-0000.

INSTRUCTIONS

Occasionally, you'll find it necessary to do some edge sanding in confined areas where a store-bought 1/2"-Dia. drum is too large. The wing feathers of the Ringneck Pheasant project on page 12 (Fig. 4 - page 14) are an example of where this homemade tool will come in handy.

For about two dollars and an hour of your time, you can make three 1/4"-Dia. sanding arbors in two lengths that will do a

good job. Here's how it's done.

Use a hacksaw to cut the threaded rod into two 3-1/2"-long and one 5" long piece; file the cut edges to remove sharp burrs. The 3-1/2" arbors will be used for edge sanding, while the 5" arbor is better for contouring because you have more abrasive surface on which to work. About 1" from one end of each short piece of rod, lock two hex nuts in place by tightening them against each other with two wrenches. On the longer rod, position the nuts about 1-1/2" from the end, as pictured in Fig. 1.

saw. Whichever saw you use, be sure to wait until you're about the saw table while cutting the sleeves. Save your dull Nos. 7 and ready to change blades. After cutting a few sanding sleeves, the blade will be ready for the trash can. Note: cut halfway into a piece of cardboard and tape it in place to prevent scratching your saw table, as shown in Fig. 2. Cut a 5-3/4" sleeve in half for the long arbor and in thirds, about 1-7/8"-long, for use on the short arbors. Use your scroll saw to cut out the easy-to-make cutting gauge pictured in Drawing No. 1. It will eliminate measuring and help insure a square cut.

Slide a sanding sleeve on the threaded rod up to the double nuts and secure it in place with a hex nut on the bottom. Make the nut only finger tight so as not to crush and distort the sanding sleeve.

When using this arbor, reduce the speed of your drill press to approximately 1200 r.p.m. Apply light pressure on the workpiece when sanding. These sleeves are not heavy duty, so be gentle and let the abrasive do its job.

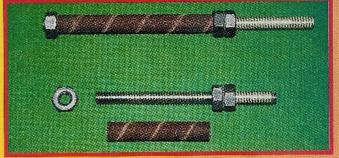
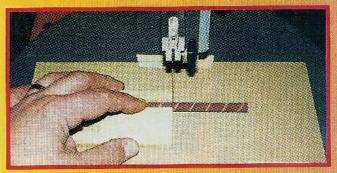
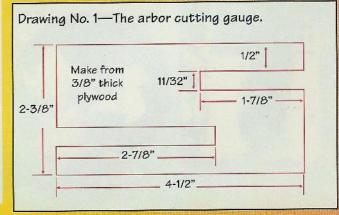


Fig. 1. Assembled "long" arbor above and unassembled "short" arbor below.



The sanding sleeves can be cut with the scroll saw or band Fig. 2. Using the cutting jig with a piece of cardboard to protect 9 blades—they'll work just fine for this.



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Forstner Bit Cube

by Frank Pozsgai



SUPPLIES

Wood: red oak—six pieces, 3/4" x 4" x 16" (will make four 4" x 4" cubes); black walnut—3/4" x 3-1/2" x 10" (for the base)

Tools: Forstner bits—3/8"-Dia., 1-1/8"-Dia., 2-1/8"-Dia, and 3-1/8"-Dia.; drill press; table saw; scroll saw with No. 9R PGT blades; router with roundover or chamfer bit; jointer; band saw; 6" Forstner bit jig (see

the accompanying sidebar); belt sander Pointed punch Semi-gloss lacquer

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Continued on page 20



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Part No. 36GMA Part No. 36FLOWER (Silver bezel, white with Arabic numerals)



(Dial decorated with flowers)

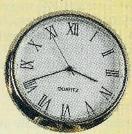
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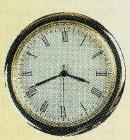
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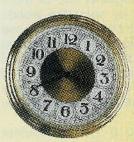
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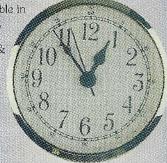
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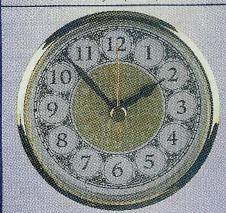
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INSTRUCTIONS

That darn cube

In the early 1980's, after purchasing a couple different sets and sizes of Forstner bits, I began to play around with them and created my own version of the Rubik's Cube!. Like the original, this version was also created by a crazy Hungarian. While its form appears to be more artistic than functional, it can be made into much more than just a conversation piece. A mini clock movement can be added, or a pen and pencil set installed into the base. By adding a thermometer, hygrometer and barometer, this can even be turned into a one of a kind weather station!

Safety, sizing, and surfacing

When making this cube, it is essential to keep safety in mind. This is due to the small stock sizes and large

power tools used to complete the project.

You'll need a solid 4" cube of wood to start, which is typically formed by laminating together two or more smaller pieces of wood. Start by selecting woods which are complementary to each other, such as those mentioned in the Supplies list. **Tip:** you may also want to consider using various colors of woods, such as red oak and walnut, or three different colors laminated together to create the block. It's also helpful to use pieces long enough to make a few extra cubes in case a mistake is made during drilling.

Glue and clamp the six pieces of red oak together face to face and allow to dry overnight. Next, use a jointer to plane off the extra 1/2" of material to obtain a 4" x 4" x 16" block. Using a band saw, cut the 16" length into four 4" cubes. Complete the block by touching up the edges on a belt or disc sander. Keep all six surface edges sharp and be sure the blocks are exactly four inch cubes—the finished project is dependent

upon this.

With a very sharp pencil, draw a line diagonally from corner to corner on all six sides. Next, mark the exact

center on all six sides with a pointed punch.

Before any drilling can start, the Forstner bit jig should be built for safety as well as accuracy (see the accompanying sidebar).

Using the extra blocks you've prepared, practice adjusting and setting up your jig and drill press. When you feel comfortable and confident that the drill press and jig are set up properly, you're ready to begin

drilling.

Using a 3-1/8"-Dia. Forstner bit, drill a hole 19/32"-deep in the center of all six surfaces of the cube (see Drawing No. 1). At this point, you will be able to see a new block inside of the block you started with, hanging by its corners. Changing to a 2-1/8"-Dia. Forstner bit, drill a 16/32"-deep hole centered in all six surfaces of the inside block. With the completion of this step, you have created a second inside block. Changing to a 1-1/8"-Dia. Forstner bit, drill a 14/32"-deep hole centered in all six surfaces of the second inside block. This will produce the third and final block. Note: be sure that all of the depths are exact.

With a 3/8"-Dia. Forstner bit, drill a hole centered completely through each of three surfaces of the innermost cube. With a little hand sanding of the inner cubes, the block will be nearly complete. Finally, using a router with a 1/8"-Dia. roundover bit, break all of the

edges of the outer cube.

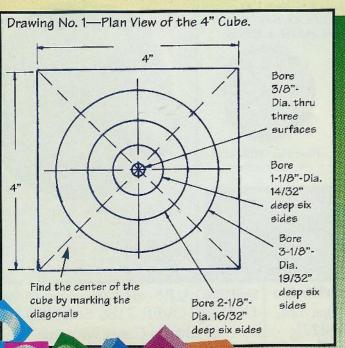
Construct the base

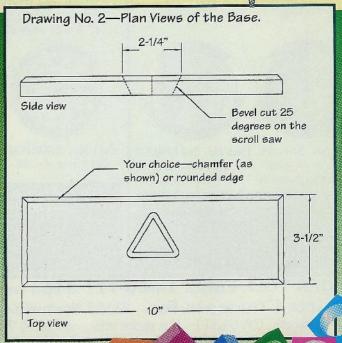
Black walnut was used to construct the base shown here. Size your wood according to the Supplies list, then with your router, either chamfer or round over the top edge. Next, tilt your scroll saw table 25 degrees to the left and, using a No. 9R PGT blade, cut the base as shown in Drawing No. 2.

For a finished look, my personal preference is to use

a few coats of semi-gloss lacquer.

When dry, place the cube in the base and your Forstner Bit Cube is ready for display!





The Forstner Bit Jig

Here is what you need to construct the 4" Jig:
Wood: two pieces 1" x 4" x 4", two pieces 1" x 4" x 6" (for the
sides of the cube holder); one piece 3/4" x 8" x 16" (for the
base); four pieces 1/4" x 3/4" x 1" (for the hold downs)
Other supplies: Glue and wood screws

Plan Views of the Jig Hold down (typ) Side View Side Cube holder (typ) 3/4" | Base (typ) Bore 2"-Dia, thru for vacuum relief Screw the hold downs in place 16" so they swivel Base Cube holder For safety, build four hold down

Forstner Bit Jig Assembly Drawing

tabs to

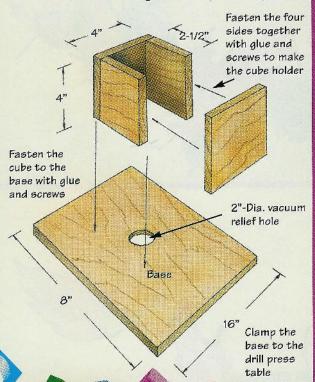
keep the

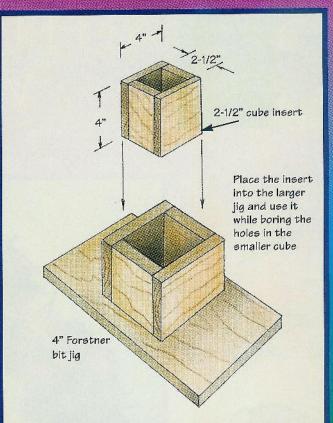
cube from sucking up while drilling

Wall

thickness

Top View





Making A Smaller Cube

For those who wish to make a smaller version of this cube, such as the 2-1/2" cube pictured, you'll need to make an insert for your jig and bore slightly different holes.

First, make the following insert for the 4"
Forstner bit jig. Size two pieces of stock to 3/4"
x 4" x 4" and two pieces to 3/4" x 4" x 2-1/2".
Glue and staple these pieces together, making
sure that they are perfectly square. At this
point, you can round over the corners slightly so
that the piece recesses easily into the 4" jig. To
secure the insert, run a couple of wood screws in
from each side which are just long enough to
hold the insert in place. You can also use your
existing four hold downs by relocating them from
the larger jig.

To make the 2-1/2" x 2-1/2" cube, prepare the stock as you did for the larger cube and size it appropriately. You will need 2", 1", and 1/4"-Dia. Forstner bits. Place the smaller cube into the insert in the jig and bore the holes as follows:

2"-Dia. bit—-15/32" deep 1"-Dia. bit—-13/32" deep 1/4"-Dia. bit—-thru three surfaces

This will produce the smaller cube shown in the photograph.



AUTUMN LEAVES WREATH

by Dan and Raymond Wilckens



SUPPLIES

Wood: Baltic birch plywood— 1/8" x 20" x 20" (for the largest wreath backer); the quantity of wood necessary to make the leaves will vary depending on personal preference

Tools: scroll saw with No. 2 blades; drill press with small drill bit; band saw; belt and hand held sanders

Temporary-bond spray adhesive Sandpaper, assorted grits Craft knife

Wood glue

Testors Visions AirPainter and paints (see the accompanying sidebar)

Four nails with heads

For more information on Dan and Raymond Wilckens' amazing patterns, contact: Wilckens Woodworking, P.O. Box 520496, Independence, MO 64052. And see them at the RBIndustries booth at The ULTIMATE Woodcrafting Festival, August 21-23, 1998.

INSTRUCTIONS

Size and cut

Make several copies of each leaf pattern, found in Full Size Pattern Section No. 2. Lay out the leaves in a wreath formation to figure out how many of each you will need for the size wreath you desire, and then multiply that number of leaves by three (it takes three layers of leaves to make the wreath). Note: the more the leaves on each layer overlap each other, the stronger the wreath will be. Next, adhere one of each pattern to the wood with temporary-bond spray adhesive, and stack as many pieces of wood as you will need, securing each stack with masking tape or small brads. With a small drill bit, drill a hole through the stacks in the waste area of each cutout. For veining lines, drill the hole at one end of the line.

Cut out each stack, then carefully remove the patterns. Next, sand each piece with a belt or hand held sander. Remove any burrs and clean up any cuts with a craft knife



or needle pick.

Lay out and cut the wreath backer of the desired diameter.

Paint the leaves as desired (see the accompanying sidebar on page 24).

Assembly

Arrange the first layer of leaves around the circle using a variety of leaf types. The leaves should be placed close together for strength. Apply glue to the back side of each leaf and glue it onto the wreath,

then repeat this procedure until you have at least three layers of leaves.

Hang your wreath securely on the wall by hammering at least three nails into the inside of the wreath, with the heads overlapping the leaves on the bottom ring. **Note:** this step is very important—if your project falls off of the wall, it will become quite a puzzle!

Your Autumn Leaves Wreath is now ready to be enjoyed for many seasons to come!

September, 1998

Autumn Leaves Wizardry

Tips on Painting The Autumn Leaves Wreath

by George "The Wizard" Ahlers

The Visions AirPainter can make short work of painting the leaves for this project. Here's what you'll need:

Testors Visions AirPainter and paints: Holiday
Green; Holiday Red; Lemon Yellow; Orange (These
colors were used to paint the leaves shown in this demonstration.
Use any colors you desire on your wreath.)
Air source

Presented here are just a few examples of the leaves from this project.

Experiment with different colors and techniques. Have fun!

Sugar Maple



Fig. 1. Spray a burst of Holiday Red onto the center area of the leaf.



Fig. 2. Spray a smaller burst of Holiday Green onto the stem area of the leaf.

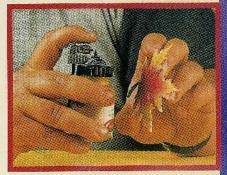


Fig. 3. Mist Lemon Yellow onto the ends of the leaf.

Red Oak

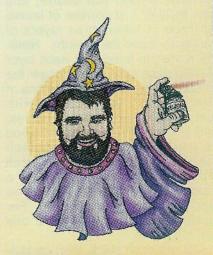


Fig. 4. Lightly spray the entire leaf with Holiday Green, then mist the ends with Orange.

Elm



Fig. 5. This is a variation of the red oak. First spray the leaf Holiday Green, then mist the ends with Holiday Red.



P.S. I'll be teaching AirPainte seminars at The ULTIMATE Woodcrafting Festival see you there!

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Joseph Herrmann					
Doug Kenney Building An Ornamental					
Sundial"					
Joanne Lockwood "Troubleshooting Scroll					
Saw Problems"					
John Nelson					
Wanted To Know About					
Scroll Sawing But Were					
Afraid To Ask"					
Shoila Polhamus "Designing Your Own					

Sheila Polhemus Designing Patterns" Roy King & Scott Kochendorfer . . .

..."3-D Image Designs Q&A" ..."Wood Carving Basics" Ivan Whillockand more to be announced!



Joseph Herrmann



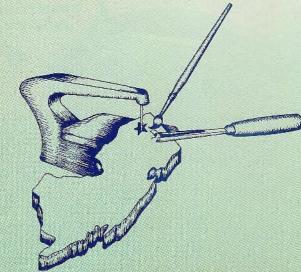
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Wes' Workshop

Subject: Saw Maintenance

by Wes Demarest

Taking a stand

Recently, my wife, Alice, and I met a fellow scroller and the conversation naturally turned to a few of the different scroll saw manufacturers. This scroller related that he was disappointed with a new saw he had purchased because of its vibration. He uses a wheelchair so he didn't purchase the optional stand. Instead, he set up the saw on a table to get the proper height and in turn got too much vibration.

He called the company for advice and was told to bolt the saw to the table. However, the vibration persisted. I suggested a heavier table and the use of a rubber or anti-skid mat, but the best solution would have been a lower stand available from the saw company.

We concluded that saw manufacturers should be more conscious of the plight of

people like my wheelchair bound friend (some companies such as RBIndustries and Hegner already are). Columns such as this may offer an additional voice. I hope so.

Before the rattle becomes a knock

I recently finished rebuilding another one of my saws. There's a lesson I should have learned the first time. That is: carefully check out any rattle, squeak or vibration as soon as it begins to develop. Caught early, it may only be a matter of lubricating the part. Once the rattle becomes a knock, it's probably too late.

For basic maintenance purposes, it helps to have a handle on the number of hours you have accumulated on your saw. A CPA friend once showed me the benefit of proper record keeping. As a result, I'm constantly documenting everything. According to Alice, I just like



Fig. 1. The drive line is where rotational motion is converted into linear motion. Any place where the direction of motion changes is subject to wear.



Fig. 2. The blade clamps are the "business" end of the saw. Make sure there is no vertical play where they attach to the arms.

collecting nonessential information. She's right of course, but by keeping track of how much time I spend cutting, I can determine the proper maintenance schedule for my saw.

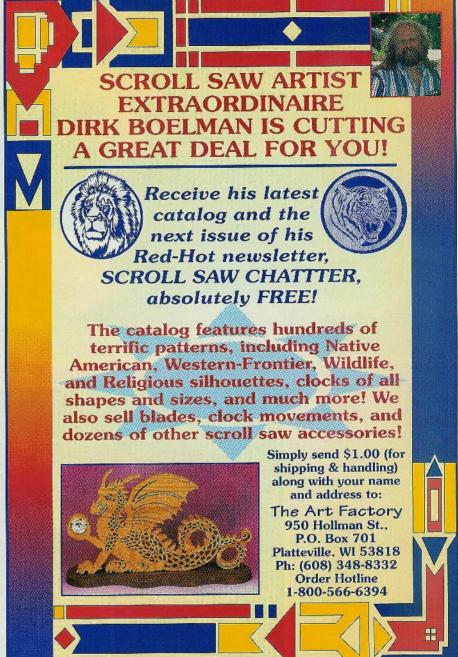
If all else fails, read the instructions

If your saw has developed a problem, take out your owner's manual and check to see if you've been following the manufacturer's recommended maintenance instructions. Perhaps you should have been applying a lubricant on a periodic basis, or making some sort of adjustment. If you haven't, try it now and run the saw again. If the problem diminishes, you may have bought some time.

If the trouble persists or is only marginally better, go back to the manual and examine the diagram(s) of the interior workings of the saw. Study the drive line—that's where the rotational motion of the motor is eventually converted to the linear motion of the blade. Become familiar with the placement of any joint where the direction of motion changes on the way to the blade clamps (see Fig. 1). These are the places where bushings or sealed bearings are likely to wear out.

The trouble with bearings and bushings

On most saws, only the drive shaft bearings or bushings make a complete rotation. That motion serves to distribute its lubrication. The remainder only make a short back and forth motion (about a quarter turn each way) which does not allow for equal distribution of lubricant.



As you become familiar with the inner workings of gs your saw, you will see how tension on the blade is transfib-mitted through the drive line. Usually, as tension increases, ort saw life decreases. The additational force of blade tension ch will tend to press whatever illubricant is present away of from the bearing surface. Neither bearings nor

bushings can tolerate a dry surface. Soon, friction will generate heat, a flat spot will develop, and then you have a problem.

Further examination

Check where your blade clamps are attached to the arms (see Fig. 2). See if you can feel the slightest bit of vertical play where they

September, 1998

Subject: Saw Maintenance



Fig. 3. There should be no play in the arms of the saw.

Fig. 4. Check the connecting rod as well as the drive shaft. If you feel any play or see lubricant squeeze out, it's time to rebuild.





Rebuilding a saw is quite an undertaking. This is me deeply involved in what I like to call "male creative time."

attach. There should be none.

Open your motor belt cover or remove whatever you have to reveal the drive shaft. Hold both arms (see Fig. 3) and move one up and one down, again feeling for any play. Then move both in unison and see if they move slightly before there is movement in the drive shaft.

Remove the plate or cover that protects the drive shaft where it attaches to the connecting rod. Hold one arm in one hand and the drive shaft, or connecting rod, in the other and check for play back to the motor (see Fig. 4). Occasionally, there will be a little bit of play—or a small amount of lubricant will squeeze out of the seal on a bearing as you flex the joints. Neither of these is a good sign. If you observe any of the previous conditions, it's time for the saw to be rebuilt.

If you are going to do the job, do it right

If the saw is still under warranty, read it carefully—you may be covered. However, most warranties only provide for defective parts, not wear and tear. The way I abuse a saw, I usually expect to rebuild it myself. Either that or foot the bill for someone else to do it.

If you elect to do the job, take my advice and replace all bearings and/or bushings no matter what their condition—if you don't, you'll be replacing the rest a whole lot sooner than you expected. By the way, an arbor press makes this job a lot easier than using a vice and sockets.

Allow yourself plenty of time and follow the diagrams in your manual closely. Most parts are specific to the way



they face. A nut may fit on either side, but proper alignment can only occur when it is on a specific side. That's a lesson I've learned the hard way.

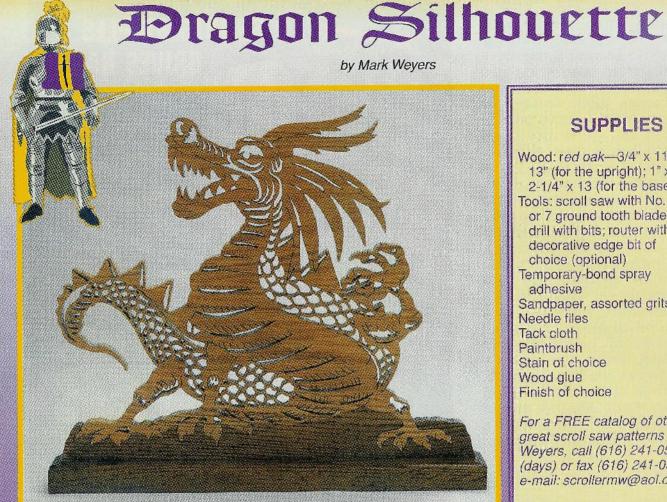
When I rebuild something, Alice usually charges admission to the shop. You see, I'm slightly dyslexic and by the time I'm finished, the saw has been taken apart and put back together one or two extra times. This process can

be quite entertaining (unless you're me). By the way, none of the spectators have ever volunteered to lend a hand without the promise of financial consideration. Not that they would be much help, as they're usually laughing too hard to hear my instructions.

Until next time, don't breathe the sawdust and see you at The ULTIMATE Woodcrafting Festival!

31

Scroll World Contest Honorable Mention!



SUPPLIES

Wood: red oak-3/4" x 11" x 13" (for the upright); 1" x 2-1/4" x 13 (for the base) Tools: scroll saw with No. 5 or 7 ground tooth blades; drill with bits; router with decorative edge bit of choice (optional) Temporary-bond spray adhesive Sandpaper, assorted grits Needle files Tack cloth Paintbrush Stain of choice Wood alue Finish of choice

For a FREE catalog of other great scroll saw patterns by Mark Weyers, call (616) 241-0511 (days) or fax (616) 241-0511 or e-mail: scrollermw@aol.com

INSTRUCTIONS Cut out the patterns

Attach the patterns, found in Full Size Pattern Section No. 1, to the wood with temporary-bond spray adhesive. Drill holes for the interior cuts, then cut out the upright pattern, beginning with the interior and finishing with the exterior cuts on the dragon, then cutting out the bottom upright piece. Cut the base to the dimensions indicated and rout a decorative profile on the

upper edge. The base pictured was routed with a 1/4" cove bit.

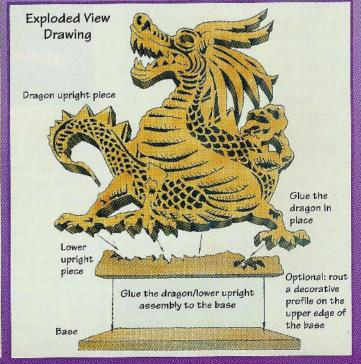
Remove the patterns from the wood, then sand where needed and clean up any cuts with needle files.

Remove any sawdust with a tack cloth, then stain the bottom upright piece as well as the base with stain of choice and allow to dry.

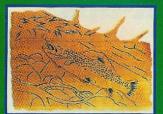
Assembly

Attach the bottom upright piece to the dragon with wood glue and allow to dry (see the Exploded View Drawing). Next, glue this assembly to the base. When dry, apply finish of choice to the entire piece.

Your Dragon Silhouette is now ready for display!



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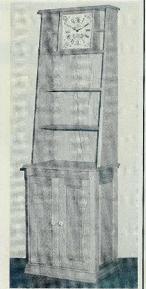
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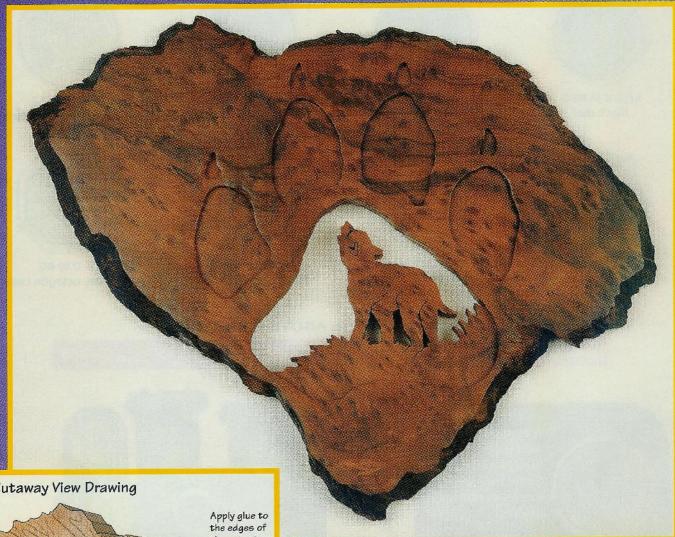
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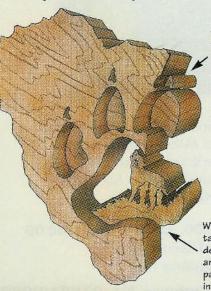


Lowing

by Marilyn Carmir



Cutaway View Drawing



the cutout pattern pieces and insert them into a recessed position.

With your saw table tilted 4 degrees, saw around the pattern as indicated.

SUPPLIES

Wood: wood burl - 10" x 10" x 3/4"*

Tools: scroll saw with No. 5 blades (12.5 tpi); drill with No. 58 bit

Temporary-bond spray adhesive

Sandpaper, assorted grits

Wood glue

Glue brush

Finish of choice

Sawtooth hanger

*Available from Custom Woodcrafts, 2240 Ferry St., Anderson, CA 96007, (530) 365-8220.

For a catalog of Marilyn Carmin's innovative scroll saw patterns, contact Heartland Creations at P.O. Box 191, Yacolt, WA 98675, (360) 686-3133.

INSTRUCTIONS

Adhere the pattern, found in Full Size Pattern Section No. 2, to the wood with temporarybond spray adhesive. Make blade entry holes with the No. 58 drill bit where indicated on the pattern.

Set your saw table 4 degrees to the right. Using a No. 5 blade, cut out the pattern, following the directional arrows. Note: this pattern uses a right table tilt. If your table tilts to the left, cut opposite from the directional arrows. Reset your table to square and saw out the wolf pup. Remove the pattern and sand as needed.

Apply glue to the edges of the paw print pieces and insert into the project, pushing them into a recessed position (see the Cutaway View Drawing). Allow to dry thoroughly, then finish as desired.

Attach a sawtooth hanger to the back, then hang your new plaque with papa pride!

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darving Section



Country Lane Relief

by Ivan Whillock



INSTRUCTIONS As easy as A, B, C

This carving creates a great feeling of space. Here's how it is done: A) Overlapping planes (the barn overlaps the tree which overlaps the hill, which overlaps the sky, etc.): B) Contrasting textures (the texture of the barn is different from the texture of the tree, while the horizontal texture of the background hill is in contrast to the vertical texture of the clump of the trees on the left); and C) Lineal perspective (the road and fence narrow into the distance and the lines of the barn vanish at the horizon line). Of course, there is the actual carved depth of the wood itself, but through these added techniques, the illusion of depth is greater than the carving depth. This "tooling the eye" is part of the fun of pictorial relief carving. Give it a try!

Step 1. Trace the pattern, found in Full Size Pattern Section No. 2, onto the wood. Don't bother to draw in all of the tiny detail lines, as you will just cut them away as you do the layering anyway (see Fig. 1).



Fig. 1. Transfer the pattern lines to the carving stock.

SUPPLIES

Wood: butternut—1" x 7-1/2" x 11"
Carving tools: No. 1-6mm and No. 1-12mm chisels;
No. 3-6mm and No. 3-16mm gouges; No. 11-3mm veiner; No. 41-12mm V-tool

Transfer paper Wood sealer Walnut oil stain Satin finish

Step 2. Make stop cuts around the sky area. To save time, skip all of the jagged edges of the trees until you have taken the bulk of the wood away, and then go back and trim up close to the lines, as shown in Figs. 2 and 3. The sky should be removed about one half the depth of the wood.

Step 3. Systematically work from the sky to the foreground: lower the hills to 1/16" above the sky, the tree behind the barn 1/16" above that, and so on until you have layered the background area. The mass of wood for the barn should be about 1/4" below the original surface of the wood (see Fig. 4). Use your eye rather than specific measurements to achieve the layers. I specify 1/16" increments only as a general guide. Learn to trust your eyes more than a depth gauge.

Step 4. Make stop cuts around the fence and around the small hill on the right, making the stop cuts progressively deeper as you progress into the picture so that the foreground slants toward the horizon line, as shown in Fig. 5.

Step 5. Concentrating on the barn now, sketch in the guide lines for the roof and the corners of the barn (see Fig. 6).

Step 6. With the No. 1-12mm and the No. 1-6mm chisels, make stop cuts around the roof. Next, make a stop cut where the lean-to shed attaches to the barn. Note: do not make stop cuts at the other corners of the barn or lean-to because they are raised edges. Angle the side of the barn into the



Fig. 2. Make stop cuts and lower the broad area of the sky.



Fig. 3. Lower the sky area between the branches.



Fig. 4. Continue layering the background.



Fig. 5. Make stop cuts around the fence and around the small hill on the right.



Fig. 6. Sketch in the guide lines for the roof and the corners of the barn.



Fig. 7. Begin working on the barn roof and the lean-to.



Fig. 8. Continue working on the roof. Slant the roofs in two ways: from left to right and from front to back.



Fig. 9. Carve in the door opening and the roof and siding lines.

lean-to stop cut, leaving the near corner of the barn high. Next, angle the right side of the barn toward the horizon line, then angle the left side of the shed slightly toward the horizon line. The roof will look out of kilter for now, but we will take care of that next (see Fig. 7).

Step 7. Slant the roofs in two ways: from left to right and from front to back. It is the pitch of the roofs that helps create the illusion of depth, as shown in Fig. 8. Now the pitch of the roof matches the angles of the building.

Step 8. Carve in the door opening with the No. 1-6mm chisel, and carve in the roof and siding lines with the veiner (see Fig. 9). Make these detail lines somewhat irregular so that the building looks old.

Step 9. Use the No. 3 sweep gouges and the veiner to shape and detail the fence post and rails, as shown in Fig. 10.

Step 10. Carve the trees by first layering the branches like shingles on a roof, and then by carving in the leaf and trunk detail with the veiner (see Figs. 11 and 12).

Step 11. Use horizontal texture for the back hills, and vertical texture for the trees to the left of the barn. Carve in the erosion lines

on the bank to the left of the road and the ruts in the road. Make the ruts smaller as the road heads back into the distance, as shown in Fig. 13.

Step 12. Coat the wood with a pre-stain sealer (otherwise the end grain will turn black). After the sealer dries according to the manufacturer's directions, brush on the walnut stain. Immediately wipe the carving off with a cloth, creating highlights and low lights as some of the stain is left in the crevices. When dry, apply a coat of satin finish.

For further reading on pictorial relief carving: Pictorial Relief Carving (Whillock) \$13.95* Relief Carving Techniques (Whillock) \$17.95* Relief Carving Treasury (Judt) \$17.95** These prices include S&H

*Available from Ivan Whillock Studio, 122 NE 1st Ave., Faribault, MN 55021, (800) 882-9379 (9-5 CST).

**Available from Treeline, 1305 East 1120 South, Provo, UT 84606, (800) 598-2743.



Fig. 10. Shape and detail the fence post and rails.



Fig. 11. Begin carving the trees by first layering the branches like shingles on a roof.



Fig. 12. Add the details, carving the features of the leaves and trunk.

Carying Section



Carving a Stylized Duck

by Ivan Whillock



INSTRUCTIONS

A few helpful suggestions

This decorative decoy can be made simply with a carving knife. However, I prefer to use full-sized carving tools. With them I can remove wood quickly in bold strokes. The most convenient hold-down system for a project of this sort

is the carver's bench screw (see the sidebar on page 74). If you don't have a carver's stand, simply cut a slot into a piece of scrap 2" x 2" x 18" and secure it to your workbench with a C-clamp (see **Fig. 1**).

Step 1. Trace the body pattern, found in Full Size Pattern Section No. 2, onto the larger block. Saw the top guide lines first. Starting at the tail, saw one side almost halfway around the body. Stop without breaking the wood away, back the saw blade out and cut the other side, again leaving the wood attached. That way, when you saw the side profile, you will not have removed the drawing or the flat surface on the opposite side of the block.

Step 2. Trace the head onto the small block and saw it out in the same manner.

Step 3. Temporarily place the head on the body where it will be positioned at completion. With the marker, make a line around the neck and a line down the center of the body, as shown in Fig. 2. The line around the neck is a reminder to keep that area flat for attaching the head. The line down the center of the back is an aid in balancing the cuts, one side to the other.

Step 4. Next, round off the corner of the body block. Round the top of the block to the center line. Leave a flat

SUPPLIES

Wood: butternut— 2" x 3" x 6" (for the body); 2" x 2-1/2" x 1" (for the head)

Tools: band saw or scroll saw; drill with 1/4"-Dia. bit Carving tools*; No. 1-16mm chisel; No. 3-16mm gouge; No. 7-6mm gouge; No. 41-12mm V-tool; carver's bench screw

Transfer paper Marker 1/4"-Dia. doweling Finish of choice

*For a carving tool catalog which includes carver's screws of all kinds, contact: Ivan Whillock Carving Studio, 122 NE First Ave., Faribault, MN 55021, (800) 882-9379 (9-5 CST). Ivan will also be teaching seminars at The ULTIMATE Woodcrafting Festival, August 21-23, 1998.

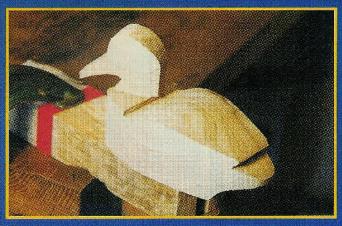
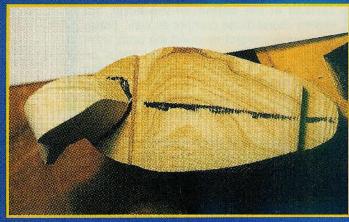


Fig. 1. If you don't have a carver's stand, a slotted piece of scrap wood secured to your bench with a C-clamp will work almost as well.



 $\label{eq:Fig.2.} \textbf{Fig. 2. Temporarily place the head on the body and mark a line around the neck, then mark the center line of the body as well.}$



Fig. 3. Round off the corner of the body block.



Fig. 4. Carve a V-groove below the wings and arc the tail area so that the upper surface is convex.

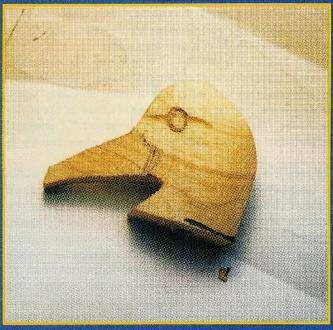


Fig. 5. Stop cut the circle of the eye and make a groove both in front of and in back of the eye.

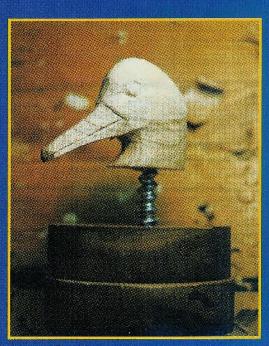


Fig. 6. Carve the facial details.

surface at the bottom of the body, but slightly round those corners as well. **Note:** It is very important to round the body thoroughly. There should be no "flat spots" on the body. Many beginners, in fear of taking off too much wood, leave their carvings very blocky. This project offers good practice in rounding, rounding, rounding! (See **Fig. 3.**)

Step 5. Carve a V-groove below the wings. Arc the tail area so that the upper surface

is convex, as shown in Fig. 4.

Step 6. Sketch in the guide lines for the eyes and the edge of the beak. Stop cut the circle of the eye with the No. 7-6mm gouge. Use the same tool to make a groove both in front of and in back of the

eye (see Fig. 5).

Step 7. Round the eye and shape the head by narrowing the head from the eye groove upward. Next, round the neck and the back of the head. Make a stop cut between the beak and the head, then lower the beak slightly to make a distinction between the two areas. Make a V-groove between the upper and lower beaks, as shown in Fig. 6.

Step 8. Carve in the feather detail for the wings and tail. Make the cuts bold and stylized because we're after bold forms rather than realistic detail. If we get too fine with the details, they will disappear in

the grain of the wood.

Step 9. Carefully center 1/4"-Dia. holes in the head piece and in the flat neck area that you saved on the body. Cut a dowel to fit and glue the head to the body, turning it as you wish for effect. Carve the neck area on both the head and body.

Step 10. Seal the carving, stain it, then complete the job with a satin finish.

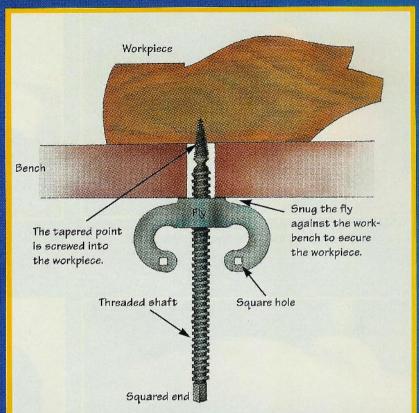
Decorative decoy carving covers a wide territory. Examples range from intricately detailed and painted, very realistic works to stylized pieces that are sanded glossy smooth. Some carvers strive for an "old" look with crude cuts and antiquing paint. Some carvers prefer hand tools; others prefer rotary burrs and woodburned detail. The options are many!

If you want to explore decoy carving further, try:

Realistic Duck Carving by Alfred Ponte (Fox-Chapell): \$9.95 plus \$3 S&H.

Waterfowl Carving by J.D. Sprankle (Stackpole): \$29.95 plus \$3 S&H.

These books are both available from Treeline, 1305 East 1120 South, Provo, UT 84606, (800) 598-2743.



The Carver's Bench Screw

A bench screw is a simple device for clamping a workpiece to your bench. Basically, it consists of a threaded shaft with a tapered point and a large nut—referred to as a fly.

The threaded point is meant to screw into the workpiece. In fact, many manufacturers incorporate a square hole, usually located in the fly, meant to engage a mating end of the threaded shaft. This allows you to easily tighten or loosen the tapered point. Next, the shaft is inserted into a hole in your bench. The whole thing is then secured by snugging the fly up against the bottom of the bench or scrap wood.

Bench screws come in a variety of sizes and are manufactured by several companies including Stubai, Marples and Veritas. The tapered point usually has a more delicate "wood screw" type of thread, while the main shaft has a stronger square type thread (like the thread found on most "C" clamps) which can withstand a great deal of pressure when the fly is

tightened.

Use of the bench screw allows the carver to work on all sides of the piece unencumbered by projecting clamps or hold down devices. To rotate the carving, all you have to do is loosen the fly, reposition the stock as desired, then tighten the fly again. On the downside, screwing the point into the workpiece does leave a fairly good sized hole in the carving. However, on many projects (such as the Stylized Duck) the screw hole can be unobtrusively placed on the bottom or back of the carving. You can also leave a little extra stock on your carving blank, use it to receive the tapered point, and then cut it off when the carving is finished.

QUANAH PARKER SILHOUETTE

by Don Haws



SUPPLIES

Wood: Baltic birch plywood—1/4" x 10" x 12" Tools: scroll saw with No. 2 blades; drill with bits

Temporary-bond spray adhesive

Craft knife or needle pick Sandpaper, assorted grits 10" x 12" piece of black felt Tacky glue

Finish of choice

For more information about Don Haws' patterns, contact Chisholm Trail Scroll Works, P.O. Box 536, Rush Springs, OK 73082, (405) 476-2643

INSTRUCTIONS

Quanah Parker (1845?-1911) was the last Comanche chief. He was a great warrior, who never lost a battle to the white man, as well as a statesman, who counted Teddy Roosevelt among his friends. Follow these simple instructions to hang a silhouette of

this great leader in your home.

Attach the pattern, found in Full Size Pattern Section No. 1, to the wood with temporary-bond spray adhesive. Make sure to

spray the paper, not the wood.

Drill holes for the interior cuts, then carefully saw out the design, beginning with the center of the pattern and working your way to the outermost cuts. Remove the pattern from the wood and clean up any cuts as needed with a craft knife or needle pick. Sand where necessary.

Apply finish of choice and allow to dry thoroughly. Next, apply a bead of glue around the back of the plaque, then adhere the felt to the plaque. Attach a sawtooth hanger to the back and your silhouette is ready for display!

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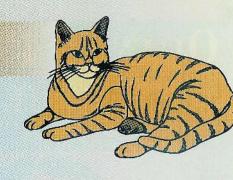
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Barving Section

The Nosy Cat





temporarily take the clamp (or carver's screw, if you so wish). When no longer needed, it can be easily removed (see Fig. 1).

Step 1. Trace the pattern, found in Full Size Pattern Section No. 2, onto the carving stock. Saw out the pattern. If you wish, leave a projection at the bottom as noted above. Draw a center line around the top and bottom edges to serve as a guide to balance your cuts.

Step 2. Make stop cuts around the legs. Moving from the back to the front, layer the body. Make indentations around the stomach to bring it out, and narrow the shoulders at the top. The cat has a narrow, sleek form. If you have a cat at home, take a look at its build. Of course, this is a caricature, so you can exaggerate and/or simplify as you wish.

Step 3. Make a stop cut between the tail and the body, then narrow the tail.

SUPPLIES

Wood: basswood—2" x 6" x 9" Tools: band saw; carving knife

Carving tools (optional): No. 1-16mm chisel; No. 5-6mm and

No. 3-16mm gouge; No. 41-12mm V-tool

Winsor & Newton Artists' Oil Colors paints: Ivory Black;

Raw Sienna; Raw Umber; Titanium White

C-clamp

Transfer paper

Linseed oil

Clear lacquer

Fan paintbrush

INSTRUCTIONS

Keeping with tradition

The Nosy Cat is a lot of fun as it peers down over the edge of the shelf you put it on. It is a versatile project because it can be carved with a knife alone, with palm tools, full-sized tools or any combination thereof.

Since I grew up, so to speak, with traditional tools, I do the bulk of my carving with them. Because the large gouges and chisels are used with both hands, it is important to have a hold down system to secure the carving. Because the cat pattern does not have any convenient places to take a clamp, a simple solution is to leave an extra section of wood extending from the bottom of the carving. That will



Fig. 1. Leave a little extra stock on the carving blank to take the clamp. Notice that the stop cuts and indentation around the stomach have been made and the shoulders have been narrowed.

Step 4. Begin shaping the forms. Round the legs, the neck, and the body. Some carvers like to make the forms softly rounded. I like to leave the carved facets to create a specific style (see Fig. 2). You're the artist on this one, so choose the treatment that suits your taste.

Step 5. Separate the ears and round the backs of the ears to create a flat plane that points forward. Make concave cuts to narrow the snout and to create the flat places for the eyes, as shown in Fig. 3.

Step 6. Sketch in the eyes, nose, mouth, and ear detail.

Step 7. Make concave cuts for the ear openings, then round the eyes in their openings. Carve a small nose and make creases for the mouth. Separate the front paws (see Fig. 4).

Finishina

I chose to paint this critter—here's how I did it. First, I

covered the entire shape with Raw Umber. Then I immediately wiped it off to leave stained, rather than painted, wood. Next. I mixed Raw Sienna and Titanium White, but just partially to allow for color variations in each brushstroke. Using just a touch of linseed oil and a fan brush. I brushed the mixture onto the cat. The Raw Umber base stain, still wet, then mixed with the other colors to form hair-like streaks. To make additional markings. I applied Titanium White in selected areas to create spots and bands. I painted the nose and pupils of the eyes Ivory Black, and then painted the whites and highlighted the eyes. Finally, I sprayed the entire piece with a coat of lacquer which dried the oil paint and left a satin sheen on the surface. If you have a cat at home, study it and paint yours to match, or simply use your imagination. Remember,

you're the artist!

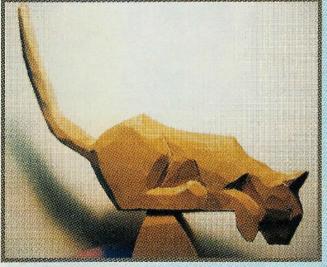


Fig. 2. Carve the various elements of the cat.

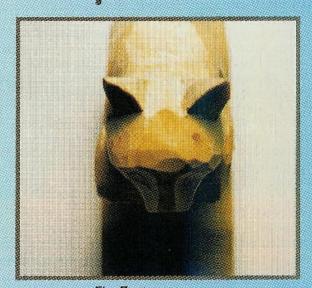


Fig. 3. Shape the ears.

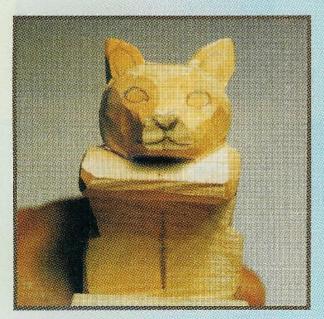


Fig. 4. Sketch in the facial features and ear details.



Fig. 5. Carve the facial details and separate the front paws.



Something Special from Raymond and Dan Wilckens

by Robert A. Becker

The Majestic Forest and Contemporary Elegance clocks are the latest creations of Dan and Raymond Wilckens. These two clocks combine traditional and contemporary design elements to produce truly magnificent heirlooms. Perhaps the most innovative feature of these 52" beauties is that the patterns for both are completely interchangeable! Any part from either clock can be replaced by the corresponding part from the other one. Through this interchangeability, it is possible to fully customize your clock.

Birth of an idea

At the initial design stage (about a year ago), a single contemporary clock was conceived of Raymond wanted this style, as Wilckens Woodworking's contemporary patterns were selling well. Dan, however, urged for the inclusion of more traditional elements. From this dichotomy, a compromise emerged: create two "sister" clocks with interchangeable parts.

Over the past year, both clocks were designed and cut simultaneously, one section at a time. Much trial and error was involved, but when the sawdust settled, Dan and Raymond were keenly satisfied with their newest creations. The price in terms of "sweat equity"? About 160 hours of design time (including assembly instructions), and another 240 hours of sawing, assembling, and finishing (about 120 hours per unit). Add to that 62 scroll saw blades!



Anatomy of two clocks:

The pedestal (base) level features 24 fretwork brackets around a box whose majestic panel designs can be backed with felt to accent the cuts. Optional ball feet under the four corners add a touch of elegance.





Majestic Forest Clock



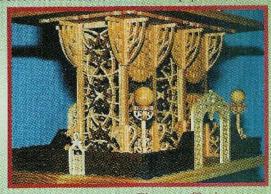
Contemporary Elegance Clock

The first floor level includes two pillar assemblies, each adorned by sixteen fretwork brackets. The floor has a fence along its perimeter, with fretwork gateways at the front and back, and two lamp posts on the front corners.

1st Floor Level

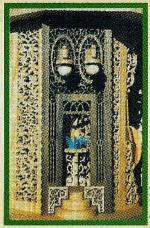


Majestic Forest Clock

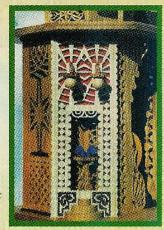


Contemporary Elegance Clock

2nd Floor Level The second level is the pendulum level, and is distinguished by a uniquely angled panel which opens into an alcove with radial steps and even a fretwork "water fountain"! Throughout the rest of this level, more dazzling fretwork abounds.



Majestic Forest Clock



Contemporary Elegance Clock

Head (Top) Level The "head" level is the top level, and it features a rectangular opening in its center that exposes the pendulum shaft. This is where the sound of the chimes exits the clock. A fretwork ring, made from contrasting wood, encircles the bezel. On each side of the top level is a door which houses the music movements. As shown in the photos, each of these doors sits under a sub-roof which is supported by fretwork brackets. The music exits the clock via two irregularly-shaped holes concealed by fretwork covers. Both the roof and sub-roof

panels have shingle lines cut into them, and the roof is further adorned with decorative pediments and overlays of an exquisite nature.



Open door shows installed music movement.



Sound of the chimes exits the clocks at this level.





Each side of the top level features a door which houses the music movements.

Assembly tips

The clock plans provide patterns for "skirting" pieces that can be used around the floors for those who do not wish to rout the edges. These skirts can also be used to cover the edges to hide the end grain if plywood is used. Also included are patterns for a small trim board that can be used to cover any mismatch between the panels and the floors.

Both clocks are designed to come apart into four individual components, making them easier to transport. Each floor has locators on the bottom that fit into locating holes in the mating section. Of course, one can choose to glue all the floors together, thus eliminating the four-components concept entirely. Incidentally, all of the pieces on these clocks can be cut with a 16" or larger scroll saw.

About the plans

In addition to the full size patterns, the plans for both clocks include complete assembly instructions. These provide step-by-step, 3-D illustrations, as well as tips for mounting your favorite music movements (available from Klockit). The patterns for each clock are provided on eighteen 11" x 17" sheets of paper for ease of handling.

The two sets of plans are available exclusively from Wilckens Woodworking, P.O. Box 520496, Independence, MO 64052. The price for each clock plan is \$22.95, or \$39.95 for both, plus \$3.00 S&H for U.S. residents, S4.00 S&H for Canada and Mexico, and \$6.00 S&H for orders outside North America.

For information about other plans you can purchase from Dan and Raymond Wilckens, please see their ad on the following page.

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As Featured In Creative Woodworks & Crafts:



Elegance Clock Majestic

Forest Clock



Contemporary



- Plans for both clocks include full size patterns and complete assembly instructions.
- Patterns for each clock are provided on eighteen 11"x 17" sheets of paper, for ease of handling.

Price: \$22.95 per clock or both for \$39.95 plus S&H

TO ORDER, SEND CHECK OR MONEY ORDER (AND MAKE PAYABLE) TO WILCKENS WOODWORKING, P.O. BOX 520496, INDEPENDENCE, MO 64052. SHIPPING CHARGES: \$3.00 per order (not per pattern) for U.S. residents, \$4.00 S&H for Canada & Mexico, and \$6.00 for orders outside North America. For catalog (without order), send \$1.00.

Carousel Silhouette

by Sheila Polhemus



SUPPLIES

Wood: mahogany or wood of choice*—1/4" x 11" x 10"

Tools: scroll saw with Nos. 2 and 2/0 blades; drill with 1/16"-Dia. bit

Temporary-bond spray adhesive

Sandpaper, assorted grits

*Available from Heritage Building Supplies, 205 N. Cascade, Fergus Falls, MN 56537, (800) 524-4184.

INSTRUCTIONS

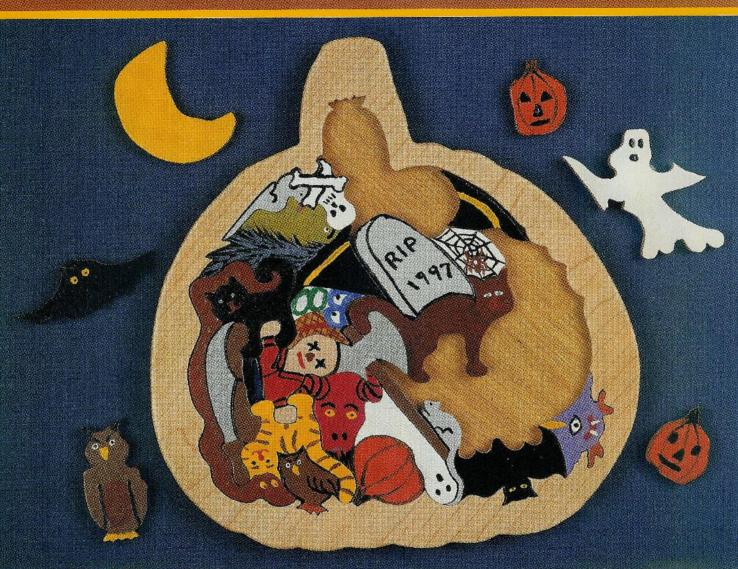
Attach the pattern, found in Full Size Pattern Section No. 1, to the wood with temporary-bond spray adhesive. Drill holes for the interior cuts (as well as for the decorative holes) where shown, then saw out the interior cuts. Be careful with the veining lines, as some of these areas are very fragile.

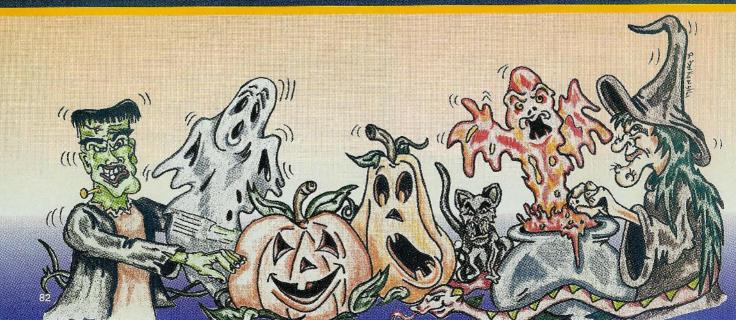
Remove the pattern, and then sand as needed. Finish as desired.

This silhouette will make a wonderful addition to your favorite child's room!



HALLOWEEN PUZZLE





SUPPLIES

Wood: wood of choice—one piece, 1/8" x 7-1/2" x 8" (for the backer); one piece 1/4" x 7-1/2" x 8" (for the puzzle) Tools: scroll saw with No. 3 blades; drill with a No. 60 bit Masking tape Temporary-bond spray adhesive Sandpaper, assorted grits Wood glue Paints of choice **Paintbrushes** Non-toxic finish of choice



INSTRUCTIONS

Stack the two pieces of wood, with the 1/4" stock on top, attaching them together with masking tape. Attach the pattern, found in Full Size Pattern Section No. 1, to the top piece with temporary-bond spray adhesive.

Saw out the outline of the pattern (see Fig. 1), then remove the bottom piece and set aside. Next, drill holes for the interior cuts (see Fig. 2) and carefully saw out the interior (see Fig. 3). Finally, separate each piece.

Continued on page 84

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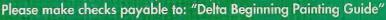


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HALLOWEEN PUZZLE continued from page 83

As this is a puzzle, there are no interior waste areas, so saw carefully. **Note:** this puzzle is made of many tiny pieces and should not be handled by small children. You could also enlarge the pattern to make the puzzle pieces larger.

Remove the patterns and sand the puzzle pieces as little as possible. Glue the frame of the top piece to the bottom piece, making sure that they are aligned, and allow to dry. Sand this assembly as needed.

Next, paint the puzzle pieces as desired, using the photograph and the pattern as a guide. Allow to dry, then finish with non-toxic finish of choice.

Assemble and enjoy your puzzle by the light of the harvest moon!



Fig. 1. Stack the 1/8" an 1/4"-thick stock and saw around the perimeter of the pattern.



Fig. 2. Drill a blade entry hole in the puzzle piece.



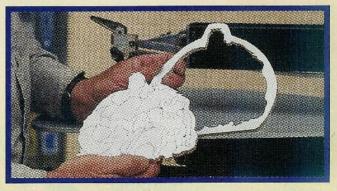
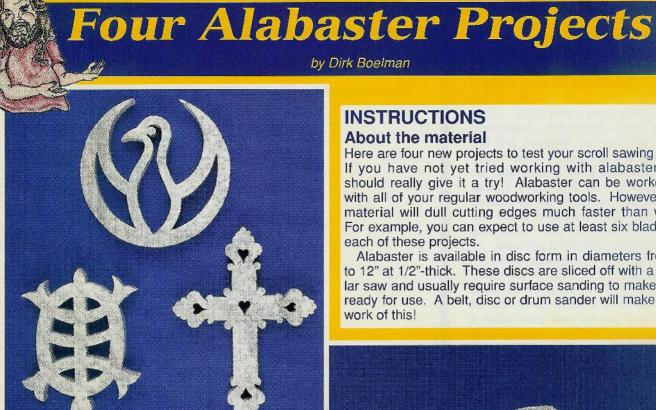


Fig. 3. Separate the puzzle pieces from their frame.



INSTRUCTIONS

About the material

Here are four new projects to test your scroll sawing skills. If you have not yet tried working with alabaster, you should really give it a try! Alabaster can be worked up with all of your regular woodworking tools. However, this material will dull cutting edges much faster than wood. For example, you can expect to use at least six blades on each of these projects.

Alabaster is available in disc form in diameters from 4" to 12" at 1/2"-thick. These discs are sliced off with a circular saw and usually require surface sanding to make them ready for use. A belt, disc or drum sander will make quick work of this!

SUPPLIES

Materials: alabaster*—one 4" disc (for the crane); two 4" discs (for the bighorn sheep); one 5" disc (for the cross); one 4" disc (for the turtle)

Tools: variable speed scroll saw with No. 3 double tooth blades: drill with 1/16"-Dia. bit; belt, disc or drum sander

Temporary-bond spray adhesive Glue Buddy**

Oil finish

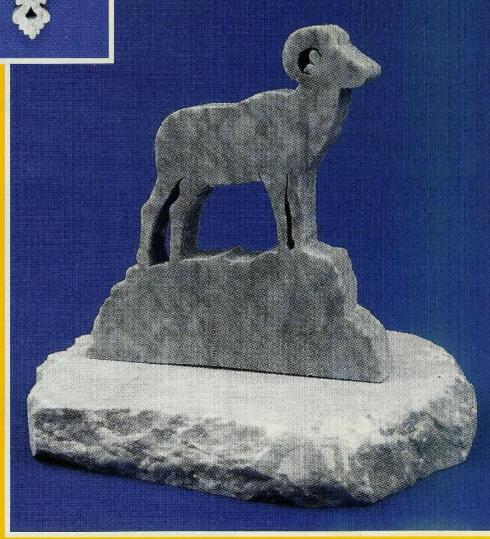
Automobile wax

Dust mask and dust collector

*Alabaster is available from Crystal Valley Stone and Alabaster, 1308 County Road 129 No. 14, Glenwood Springs, CO 81601, (970) 947-0006. Prices are as follows: 4"-Dia. blanks-\$3.95 each; 5"-Dia. blanks-\$4.95 each: 8"-Dia. blanks-\$9.95 each (plus shipping, minimum 3 disc order).

**Available from the Art Factory, P.O. Box 701, Platteville, WI 53818. (800) 566-6394.

Both Crystal Valley Stone & Alabaster and Dirk and Karen Boelman will be at The ULTIMATE Woodcrafting Festival!



September, 1998

Four Alabaster Projects continued

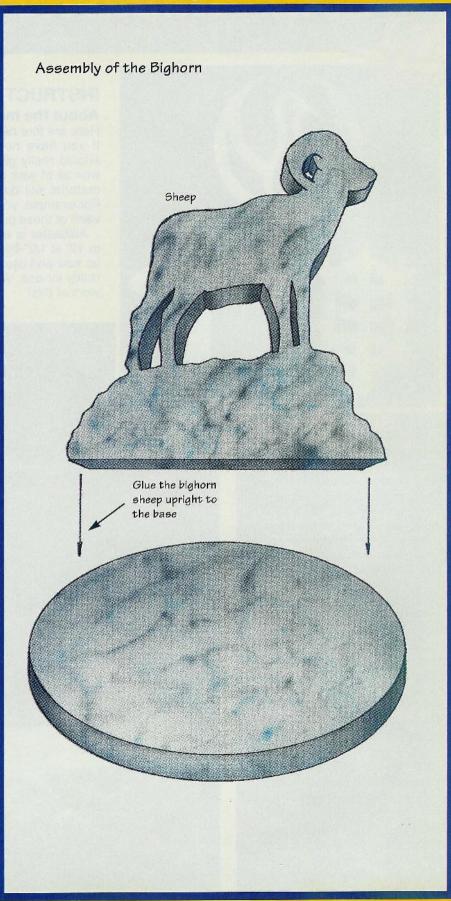
Sawing advice

Once the surface is prepared to your satisfaction, adhere the patterns, found in Full Size Pattern Section No. 1, to the alabaster with temporary-bond spray adhesive. Bore blade entry holes with a 1/16"-Dia. (or smaller) drill bit. To cut the patterns, I used Olson No. 3 double tooth blades and ran my saw at slow to medium speed. Note: the sawing process creates lots of white, powdery, chalk-like dust. Wear your dust mask and use a dust collector if possible.

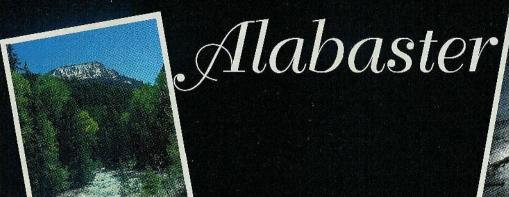
While sawing, maintain constant hand pressure on top of the workpiece. You do not want to allow the blade to bind or otherwise lift up the material and then slam it back down on the saw table-if that happens, your project will most likely break. As soon as you notice that the blade is no longer sawing very well, remove it and install a new one. As the teeth wear off the blade, you'll start feeling increased friction as the blade passes up and down through the material (it will feel like vibration). You'll also notice a decrease in the amount of dust being removed from the saw cut. The reason I stress this is because most of us try to make our blades last as long as possible. This is okay when working with wood, but you just can't do it with alabaster. Change the blade often and your problems will be minimal!

After sawing, remove the pattern. Immerse the piece in running water to remove the dust. Touch up any imperfections, assemble the bighorn sheep as shown in the illustration, then finish as desired. Clean up with water, then allow to dry. You can either leave your piece natural or apply clear oil if desired. Finish off with hand-rubbed automobile wax for a gorgeous finish!





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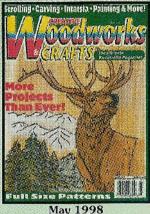
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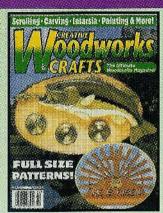
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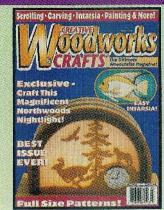
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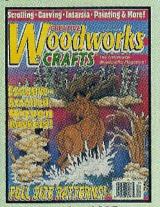
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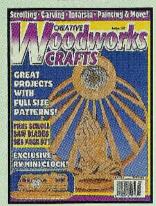
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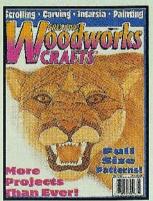
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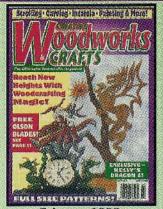
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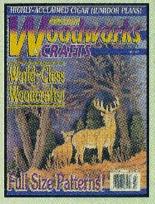
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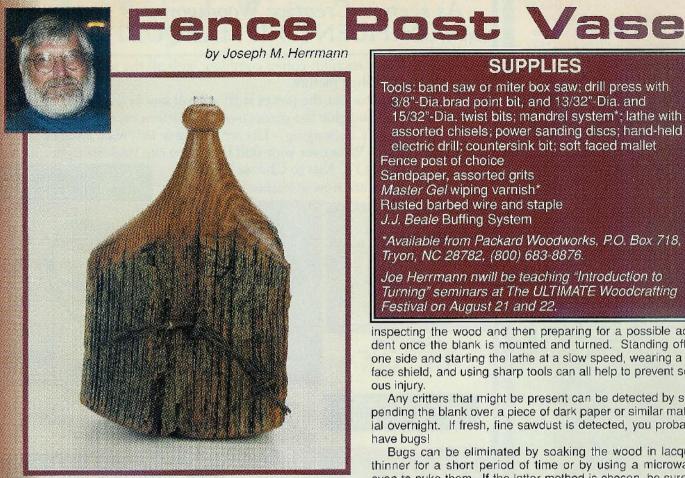
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INSTRUCTIONS

Uncovering a beautiful material

Years ago, much of the countryside was lined with split rail tence posts that were used to support the barbed wire which sectioned off small farms and kept the livestock corralled. Over time, many of these fence posts have been replaced with metal posts that are easier and cheaper to obtain. Most of the uprooted wooden fence posts then became fireplace

It's hard to believe that a recycled fence post can yield such a beautiful project after being buried in the ground and subjected to the whims of the weather for decades (see Fig. 1). Yet this is exactly the case with the project featured here. A section of old fence post has been mounted on the lathe. then the top and bottom have been turned to reveal the sound wood beneath. This project adds a whole new dimension to recycling!

The fence post we used is chestnut. That, along with white oak, locust, and Osage orange are the most commonly used woods for fence posts in my area. Occasionally, cherry, walnut, and curly maple can be found and these make beautiful vases as well. However, if you are fortunate enough to live in an area where red cedar posts are abundant, use that! In my opinion, it makes the most beautiful wood for fence post vases.

One of the biggest concerns in undertaking a project of this nature is to select solid wood that is free from any hidden cracks that might cause the blank to explode when it is subjected to centrifugal force while being turned on the lathe. In addition, bugs and other beasties often lurk inside such wood and you would not want to introduce them to your furniture or the other woods inside your home.

Cracks and similar defects can be identified by carefully

SUPPLIES

Tools: band saw or miter box saw; drill press with 3/8"-Dia.brad point bit, and 13/32"-Dia. and 15/32"-Dia. twist bits; mandrel system*; lathe with assorted chisels; power sanding discs; hand-held electric drill; countersink bit; soft faced mallet

Fence post of choice Sandpaper, assorted grits Master Gel wiping varnish* Rusted barbed wire and staple J.J. Beale Buffing System

*Available from Packard Woodworks, P.O. Box 718, Tryon, NC 28782, (800) 6<u>83-8876.</u>

Joe Herrmann nwill be teaching "Introduction to Turning" seminars at The ULTIMATE Woodcrafting Festival on August 21 and 22.

inspecting the wood and then preparing for a possible accident once the blank is mounted and turned. Standing off to one side and starting the lathe at a slow speed, wearing a full face shield, and using sharp tools can all help to prevent serious injury.

Any critters that might be present can be detected by suspending the blank over a piece of dark paper or similar material overnight. If fresh, fine sawdust is detected, you probably

Bugs can be eliminated by soaking the wood in lacquer thinner for a short period of time or by using a microwave oven to nuke them. If the latter method is chosen, be sure to take out any nails, staples, or wire and pick a day when your wife is out of the house.

Prepare the stock

Start the construction process by cutting off approximately seven to eight inches of fence post (see Fig. 2). Inspect the wood for defects and treat any bug infestation before proceeding further (see Fig. 3). Remove any barbed wire, saving it for later decoration. Staples often cannot be removed from the post because the wood has shrunk around the legs of the staple. In such cases, you'll have to work around the metal or else select another section. If you position the cut so that the staple is approximately three inches from the bottom of the finished vase, the metal shouldn't be a problem.

The hole for the glass vial must be bored before the project is turned. Turning "around the hole" insures that it will be in the center of the turning once you are finished. Besides, it would be almost impossible to bore the large hole in the slender neck of the vase after turning.

The hole doesn't necessarily need to be in the exact center of the block anyway. What's more important is that the hole be more toward the center of the mass of the blank. Otherwise, the blank will be too far out of balance to be turned safely. I "eyeball" the blank, form an imaginary circle that connects the "flats" of the chunk, and then try to center the hole in the center of this circle (see Fig. 4). Having the blank a little off-center can add to the visual appeal of the vase, too.

I drill the hole in a series of steps, starting with a 3/8"-Dia. brad point bit to a depth of 2-1/2" (see Fig. 5). Next, I follow up with a 13/32"-Dia. bit to accommodate my mandrel system. Finally, I use a 15/32" twist drill bit and drill to a depth of 2-3/4". This permits about 1/4" of the glass vial to show

above the top of the wood. I like to use a twist drill bit because the point matches the profile of the base of the glass vial better.

Turn the vase

I had a special mandrel made at a local machine shop to hold the blank while I turned it. However, a piece of 3/8" drill rod held in a three-jawed chuck would work equally well for just a couple of turnings. If you opt for this method, you can enlarge the hole for the vial on the drill press after the vase has been turned. The initial 7/64"-Dia. hole will be enough to insure that the final hole will be centered.

I would hesitate to use an actual drill bit (like we did for the small vases in the July issue of Creative Woodworks & Crafts) for fear of it being too brittle to stand up to the demands of the project. It might shatter and cause the piece to be thrown from the lathe!

Set the lathe for a slow initial speed. You can always speed it up later once you are satisfied that the piece is balanced. Once the blank is spinning, move the live cup center into position and secure the blank between centers. Sometimes what you think is the bottom center isn't! By turning on the lathe, the piece will tell you where the real center is located and you can move the tailstock into the proper position.

A shearing cut works best for this project. I use a large gouge to turn the ends to the shape I want. It will be difficult to work through the sharp corners of the project if a scraping method is employed instead (see Fig. 6).

Work on the bottom of the vase first, turning a half bead on the bottom of the project just enough to expose "new" wood and to provide a location for the base of the vase. Here, I turn a slight indentation because lathe projects sit best on a ring rather than on a flat surface. The little nub that remains which houses the cup center will be removed later.

Turning the top of the vase provides a bit more of a challenge (see Fig. 7). Until you get into the "meat" of the blank, you will be essentially turning mostly air. Watching the top profile of the vase rather than the tool will provide some visual references as to the location of the cut and will enable you to proceed with a little more confidence.

I begin the turning at the top of the vase and work back into the main body while I reduce the diameter of the top and turn it to the required shape. Each vase is different and will be of a slightly different proportion than any other one.

Essentially, what you are forming is a large cove.

Once you have turned the left side down so that you have approximately 7/8"-Dia. left, you should form a 1/2" wide bead on the left end of the vase. Next, blend the curve into the bottom edge of that bead so that the bead stands proud of the surrounding wood (see Fig. 8).

At this point, you might want to speed up the lathe a little to produce a cleaner cut. Using a shearing cut greatly reduces the sanding that must be done to finish the turning. Scraping tears the wood fibers and required much more sanding to eliminate the resulting defects.

Sanding

This project would be virtually impossible to sand by hand with the lathe running, so I power sand the blank using a hard rubber disc mounted in the hand-held electric drill (see Fig. 9). I start with 120 grit abrasive and work down to 320 grit. If you are careful, you can efficiently sand the project within several minutes. After all the major imperfections and scratches have been removed, I switch to a veloro backed pad and power sand from 240 down to 400 grit. The velcro disc is backed by a foam pad that is more "spongey" than the hard rubber disc and it softens the edges of the newly cut



Fig. 1. An old fence post as it comes out of the ground, including staples, bits and pieces of barbed wire, and maybe even bugs!

2. Cutting off a chunk of the fence post on the band. The band saw is probably machine of cholce because of its ability to cut thicker tack. This fence post could never have been cut on any other saw in a single pass. ither saw in a single pass.



Fig. 3. Location of possible bug infestation. A little lacquer thinner will be poured over this spot to hopefully eliminate anything that has taken up residence.

Fig. 4. Circle plotted onto the top of the indicated by the "X.



Fig. 5. Drilling out the initial hole with a 3/8"-Dia. brad point drill bit to a depth of 2-1/2".

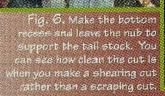






Fig. 7. Working on the top to form the large cove. Start at the top and work your way back, reducing the diameter of the top as you go.

91 September, 1998

surfaces, blending them into the weathered portions better.

After the project is turned and sanded, the bottom nub that held the cup center must be removed. I turn the nub down as far as possible and then I back off the tailstock and further reduce the tenon until the nub is free.

I lock a 2" velcro backed disc in the chuck of the drill press and use it to sand off the bottom recess (see Fig. 10). I start from the center of the recess and work toward the edge, being careful not to lose the sharp edge that was formed when I turned it. Work around the entire recess until it is smooth. A little hand sanding might still be necessary though.

At this point, it is usually necessary to ream out the hole for the vial with the drill bit (see Fig. 11). Often, the hole will close up slightly because of the heat generated by turning and sanding, causing the vial to stick. And the only way to remove a stuck vial is to break the glass and drill out the bro-

ken pieces.

Finally, I like to chamfer the top of the hole slightly just to give it a more finished look. I use a countersink bit in the drill press and go down about 1/16" (see Fig. 12).

Finishing

I like to finish the vase by coating the newly turned surfaces with a wiping varnish (see Fig. 13). It's easier to apply than a brushed-on varnish, yet will protect the surfaces better than oil. The one I use is called "Master Gel." I think that it brings out the beauty of the new wood and makes a nice contrast with the weathered portion. I have also found that the oil reacts on the edge between the new and old surfaces and turns it a nice black color-almost like a pencil line defining the border. Two coats are usually necessary, rubbing down the initial coat with 4/0 steel wool following the manufacturer's instructions. Care should be taken here so that you don't slop the oil on the old, weathered wood-that should be left completely natural.

For the final finishing process, I like to use the three-step buffing system developed by J.J. Beale. It consists of an initial buffing with a Tripoli compound. Tripoli is slightly abrasive and will remove small scratches that you might have missed. It is not, however, a substitute for careful sanding. This is followed by a white diamond mixture that removes any residual Tripoli and begins the polishing process. The final step is a hard carnauba wax. This system produces a very durable fin-

ish with a high shine.

Wiring the vase

The fence post vases are much more appealing if they have wire attached. However, most real fence posts only have two or three strands of barbed wire, limiting the number of sections that actually have wire on them. Therefore, if the section that I used didn't have any wire attached, I add some now. It's kind of an "after-market" option that can add a minimum of \$5 to the purchase price.

Cut off a section of rusted wire and bend it into an appealing shape. Hold the wire up to the vase and determine where the staple must be attached to secure it in place. Remember, the wire doesn't have to be placed in a horizontal plane.

The wood on the fence post is probably so hard that you'll never be able to drive a staple it. Therefore, you'll have to drill a pilot hole first. Use an appropriate diameter drill bit, just slightly smaller than the legs of the staple, then drill the hole in the proper location.

Select a rusted staple and use a soft faced mallet to drive it home (see Fig. 14). A metal faced hammer will remove the rust and make a shiny spot which sticks out like a sore thumb!

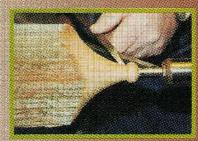


Fig. 8. After forming the bead detail, underout the cove to bring it in line with the base of the

ig. $oldsymbol{eta}$. Power sanding the with the velore disc



Fig. 10. Sanding the recess, working from the center out.

Fig. II. Reariting the hole o that the glase vial will t. Tueed a 15/32" twist rill bit and went down to a depth of 2-5/4"



the top of the hole for a more finished look. It's often the little details that separate the good from the "just okay" work.

Fig. 13. Applying the wip-ing varnish to the top. Two scate are necessary, and after the second coat is dry it is buffed.



Flg. 14. Driving the staple home with a soft faced mallet. Note that the wire is not horizontal.

1903 WRIGHT FLYER

by Christopher Adams



SUPPLIES

Wood: 5-ply plywood—two pieces, 1/4" x 13" x 5-1/2" (for the wings, elevators, and rudders) and one piece, 1/4" x 5" x 1-1/4" (for the pilot); 3-ply plywood—two pieces, 1/32" x 2-3/4" x 1-1/4" (for the propeller blades); birch—two pieces, 3/8" x 3/8" x 3/4" (for the propeller hubs)

Birch doweling: 3/16"-Dia.—twelve 3-3/4" lengths (for the wing struts); eight 3/8" lengths (for the elevator and rudder separator peg joiners); four 1/4" lengths (for the stand peg joiners); 1/4"-Dia.—two 14-1/8" lengths (for the lower struts); two 5-3/4" lengths (for the upper rudder struts); two 7" lengths (for the upper elevator struts); 3/8"-Dia.—two 4" lengths (for the motor-propeller mounts); four 1-1/4" lengths (for the elevator and rudder separator mounts); eight 1/2" lengths (for the stand pegs and upper strut holders)

Tools: scroll saw with No. 5 blades; drill with 1/16", 11/64", and 1/4"-Dia. bits; screwdriver; hand held orbital sander with 120 and 180 grit abrasives ScrollSanders* in 120 and 180 grits (1/2" wide) Two No. 4 x 1" brass round head wood screws

(for the propellers)
Four No. 4 washers
One eyehook
One snap swivel
Wire hanger
Tack cloth
Exterior latex paints in Black, Brown, and White
Graphite transfer paper
Sharp pencil or awl

Sharp pencil or awl
Double-sided poster tape
5-minute epoxy
Titebond or other glue
Paintbrushes of choice
Rubber bands
Masking tape
Toothpicks

*To order ScrollSanders, or to find out about other Crawford-Adams designs, contact Crawford-Adams Enterprises, P.O. Box 1086, Dept. WF, Verdi, NV 89439, (702) 345-1660.

September, 1998

INSTRUCTIONS

Cut the pieces

Stack the two 5-ply plywood pieces together with double-sided tape. Trace the pattern outlines of the wings, elevators, and rudders (found in Full Size Pattern Section No. 2) onto the wood with graphite paper. Cut out the wings, elevators, and rudders on the scroll saw. Do not separate the wood pieces until all wing strut, elevator, and rudder holes are drilled with the 11/64"-Dia. bit. Sand the edges to shape with 120 grit ScrollSanders.

Separate the wings, elevators, and rudders, then label the sides of each piece which face each other. These sides will again face each other when assembled later. Tilt the table on your saw and use 120 grit ScrollSanders to round the edges of all pieces.

Select the lower wing. On the side which will face the upper wing, drill two 1/16"-Dia. holes 1/8"-deep for the pilot mounting assembly. On the underside of the lower wing, drill four 11/64"-Dia. holes 1/8"-deep for the lower stand pegs. Trace the pilot pattern onto the wood and cut out the figure. Drill 1/16"-Dia. holes as marked 1/8"-deep. Round the edges of the pilot with ScrollSanders the same as you rounded the wings. Sand all surfaces with an orbital sander or by hand.

Cut all dowels to length as indicated in the Supplies list. Sand a slight taper onto the last 3/16" of the ends of the upper elevator and upper rudder struts. Sand all wing struts lightly.

In the motor-propeller mount dowels, drill 11/64"-Dia.

holes 2-1/4" apart and parallel to receive the wing struts as shown. Drill a 1/16"-Dia. hole in the propeller end of the motor-propeller mounts to receive the propeller screws. Sand and round the short end with ScrollSanders.

In the 1/2"-long x 3/8"-Dia. stand pegs, drill a 11/64"-Dia. hole 1/8"-deep in one end only. In the 1" long x 3/8"-Dia. elevator and rudder separator mounts, drill a 11/64"-Dia. hole in both ends 1/8"-deep, then drill two 1/4"-Dia. holes separated by 3/16" either side of center on the same side, approximately 1/4"-deep. On the 1/2"-long x 3/8"-Dia. upper strut holders, drill a 11/64"-Dia. hole through the dowel, then drill one 1/4"-Dia. hole approximately 1/4"-deep in the center of the dowel.

Assembly

The plane is basically a three-dimensional jigsaw puzzle. Pre-assemble all pieces before gluing to assure their proper location and fit when glued in place.

Glue the 3/8"-long x 3/16"-Dia. joiners into the holes in the elevators and rudders, leaving 1/8" of the dowel projecting from the inner (facing) surface of each (see the Elevator/Strut and the Rudder/Strut Assembly Drawings).

Glue the 1/4"-long x 3/16"-Dia. joiners into the ends of the stand pegs. Glue the wing struts into the motor-propeller mounts (see the Wing/Strut Assembly Drawing). On top of the four center

wing struts, glue the short upper strut holders in place, leaving 1/4" of the wing strut projecting on the end for later insertion into the upper wing.

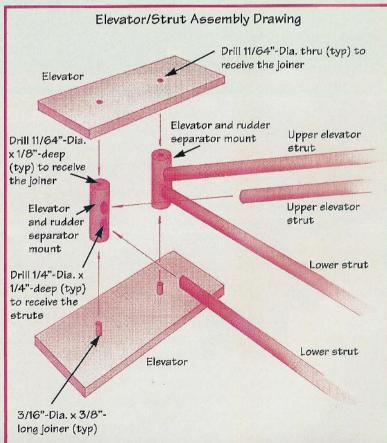
Glue the long lower struts into the bottom rudder separator mount (see the Rudder/Strut Assembly Drawing), making sure all angles are correct for the rudders and elevators. Glue the upper rudder struts into the upper rudder separator mount, with the dowels spaced for later placement in the upper wing joints. Glue small toothpick pieces into the pilot, allowing the toothpick to project 1/8" from the bottom of the pilot.

Make the propellers

For a more realistic appearance in the wind, the propellers are made such that the right propeller turns counterclockwise and the left propeller turns clockwise when viewed from the rear and the plane is pointing into the wind. Cut out the propeller blades and sand. Cut 1/32" slots diagonally across the 3/8" square birch hub. Drill the propeller holes. Pre-assemble the propellers for correct orientation, then glue the propeller blades in place (see the Wing/Strut Assembly Drawing).

Painting

Most of the painting should be done prior to assembly as it is easier that way—just be careful to leave the gluing surfaces unpainted. Remove any sawdust with the tack cloth, then paint as shown in the main photograph. The wing, elevator, and rudder surfaces are painted



with two coats of White. Do not paint inside any drilled holes. All struts are painted Brown. Leave 1/4" (or less) of the wing struts unpainted for gluing. Do not paint the ends of the elevator or rudder separator mounts. Paint the pilot Black, leaving the toothpick stubs unpainted.

Final assembly

Glue and assemble the elevators as shown in the Elevator/Strut Assembly Drawing. Hold the elevators parallel to each other using rubber bands or masking

tape until dry.

The wings are assembled in steps. The wing struts are glued in place on the upper surface of the lower wing (see the Wing/Strut Assembly Drawing). Glue the four outer struts in place. Next, glue the motor-propeller mount struts in place, with the long ends (which hold the propeller) toward the rear of the plane (the same side as the scalloped rear edge of the wing). Glue the four center wing struts in place, making sure the 1/4"-Dia. holes in the 3/8"-Dia. dowels are correctly oriented. Make sure that all struts are flush with the bottom surface of the wing. Allow to dry.

Apply glue to the upper wing holes and the wing struts, then quickly insert the struts into the wing, starting from one side of the wing and working to the other. Wipe any excess glue off with a damp cloth. Make sure the struts are pressed in place so that the ends are flush with the top surface of the upper wing. While still wet, place the front edge of the wings on a flat surface, making sure that the wing edges are parallel and the

wings are not twisted. Allow to dry thoroughly.

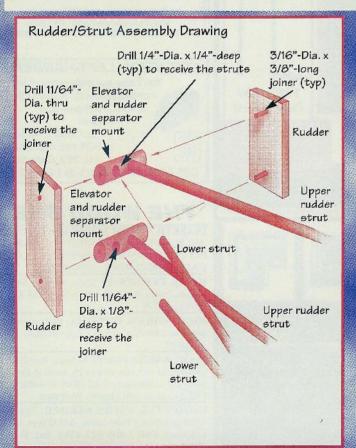
Glue the stand pegs in place on the bottom of the lower wing. The long lower struts are glued to the bottom of the wing with epoxy. Pre-assemble the lower struts around the stand pegs with the upper angled elevator struts in place. Mark the position of the lower struts on the wing and glue in place. Glue the upper elevator struts in place with epoxy as well.

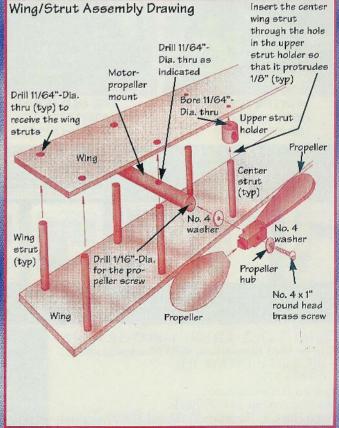
The rudder separator mounts allow the rudder to be positioned vertically prior to gluing. Pre-assemble the rudder surfaces, holding the pieces together with rubber bands or masking tape. Glue the rudders to the separator mounds, then use epoxy to secure the upper rudder struts to the upper dowels in the wing struts prior to drying. Glue the pilot in place.

Finishing

Paint all remaining wood surfaces and glue joints either White or Brown as required. Next, attach the propellers. The center of gravity (balance) must be determined to permit the plane to hang level. Using an awl or sharp pencil, determine the hook position by supporting the plane from underneath the upper wing just above the pilot. When the balance point is determined, transfer its position to the top surface and install the eyehook. Use a wire hanger and snap swivel to hang the plane.

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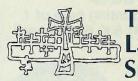
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Insert clock numbers	Bezel Diameter	Mounting Depth	Alarm	Battery Type	1+	5+	10+	25+	50+	100+
NE-75 MM-AW	2 15/16"	5/16"	NO	*Button	6.25	6.05	5.80	5.55	5.25	4.55
NE-75 MM-AW-AL	2 15/16"	**3/4"	YES	"Button	7.25	7.05	6.80	6.55	6.25	5.55
NE-72 MM-AW	2 13/16"	1/2"	NO	N-CELL	5.95	5.75	5.50	5.25	4.95	4.25
NE-72 MM-AW-AL	2 13/16"	**3/4"	yes	N-CELL	6.95	6.75	6.50	6.25	5.95	5,25
NE-72 MM-RW	2 13/16"	1/2"	NO	N-CELL	5.95	5.75	5.50	5.25	4.95	4.25
NE-72 MM-RW-AL	2 13/16"	**3/4"	yes	N-CELL	6.95	6.75	6.50	6.25	5.95	5.25
NE-70 MM-AW	2 3/4"	1/2"	NO	N-CELL	5.95	5.75	5.50	5.25	4.95	4.25
NE-66 MM-RW	2 5/8"	1/2"	NO	N-CELL	5.60	5.40	5.15	4.90	4.60	3.90
NE-74 MM-AW	2 7/8"	5/16"	NO	*Button	6.25	6.05	5.80	5.55	5.25	4.55
NE-74 MM-RW	2 7/8"	5/16"	NO	*Button	6.25	6.05	5.80	5.55	5.25	4.55
NE-74 MM-RW-AL	2 7/8"	**3/4"	yes	*Button	7.25	7.05	6.80	6.55	6.25	5.55
NE-70 MM-RW	2 3/4"	1/2"	NO	N-Cell	5.95	5.75	5.50	5.25	4.95	4.25

^{*}Includes an installed button battery ** Must have rear access

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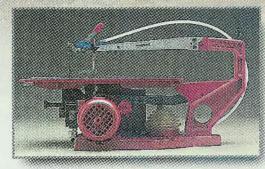
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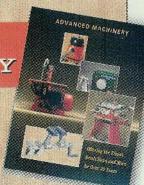
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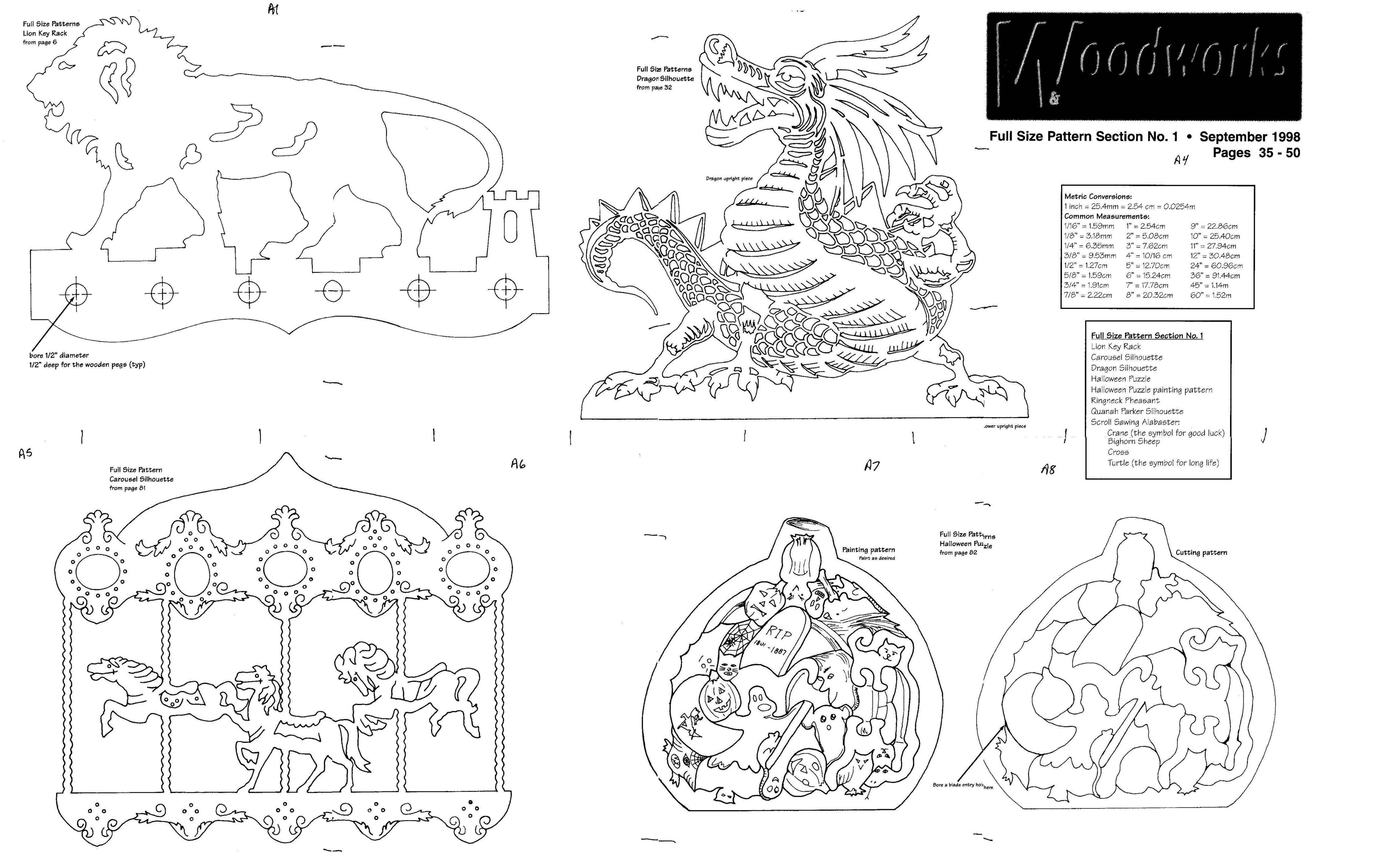
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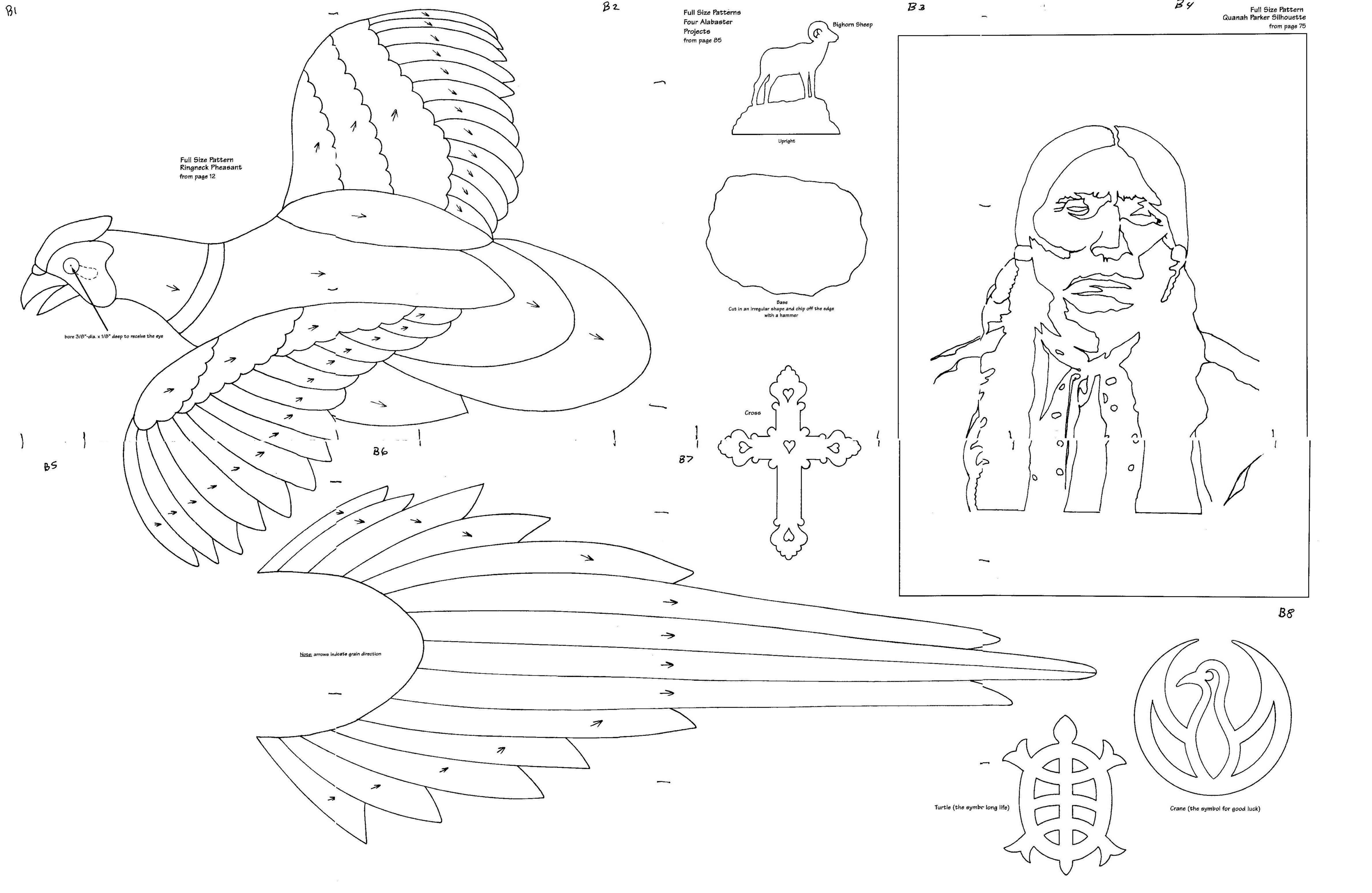
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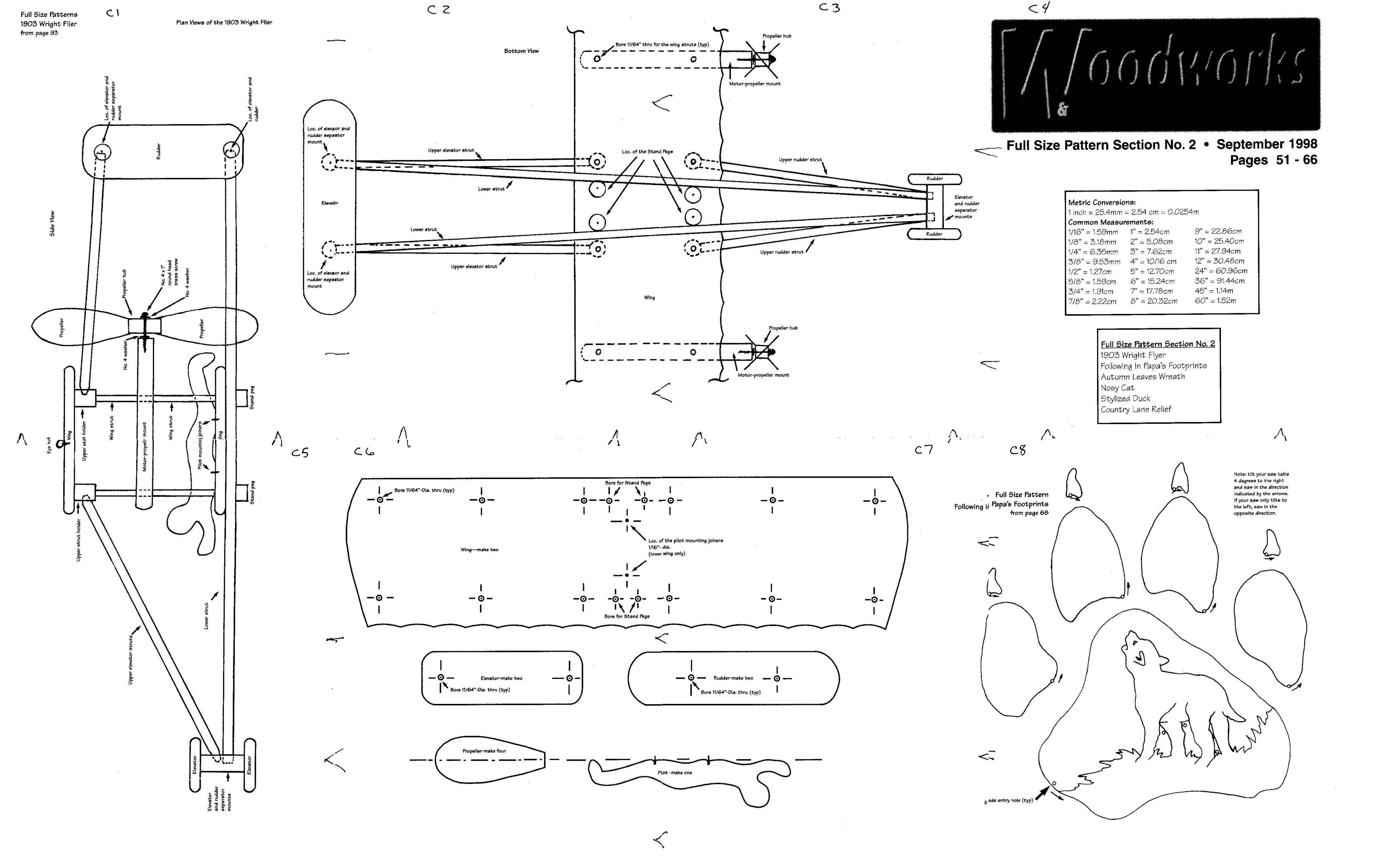
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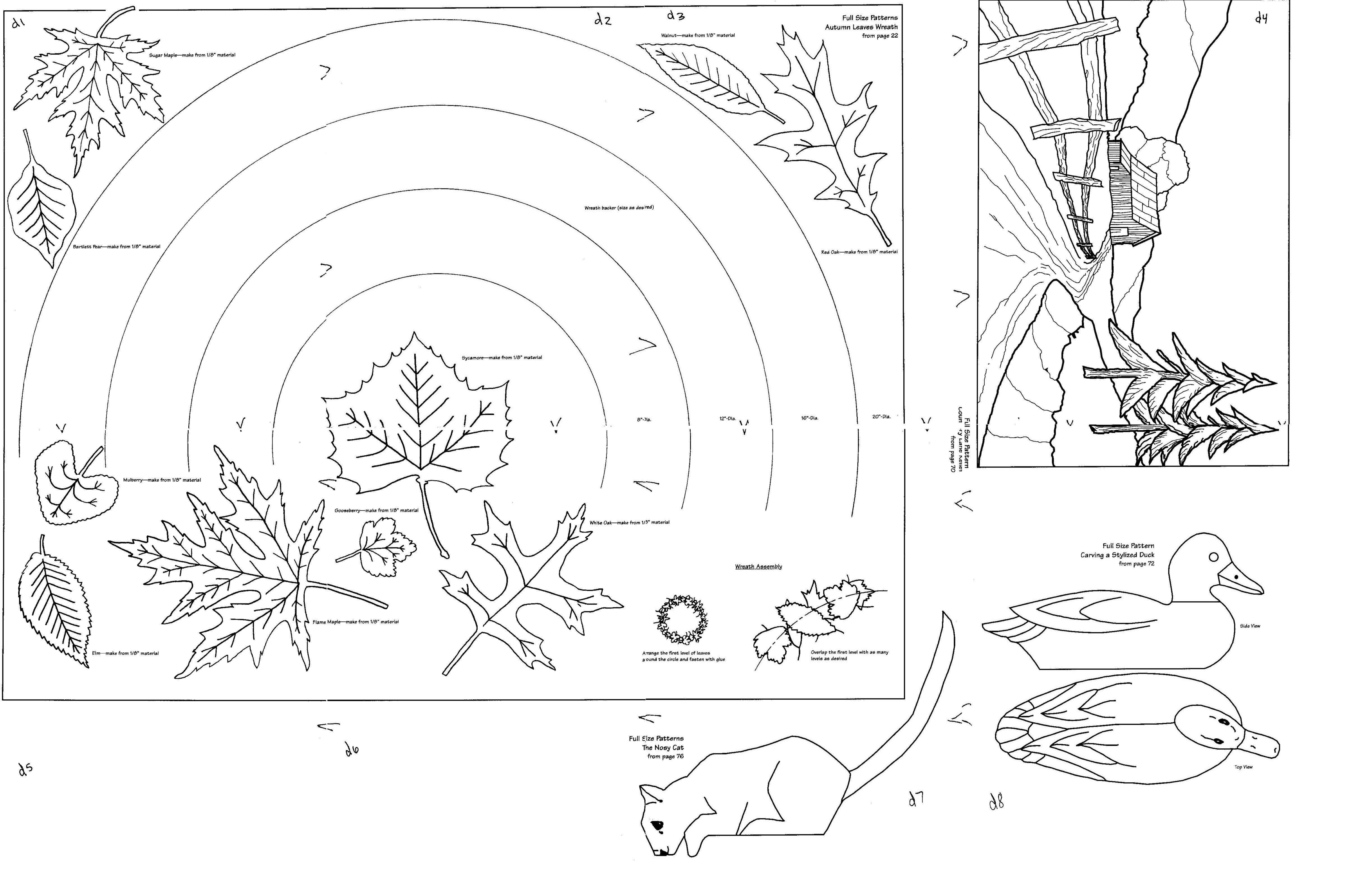
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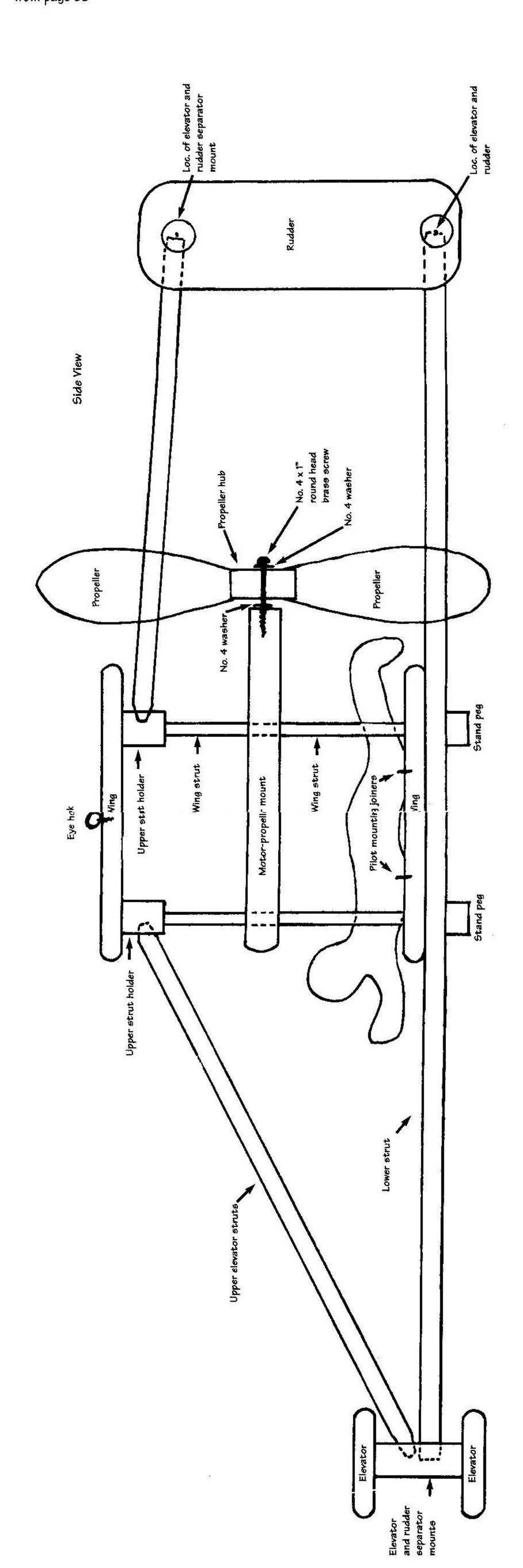


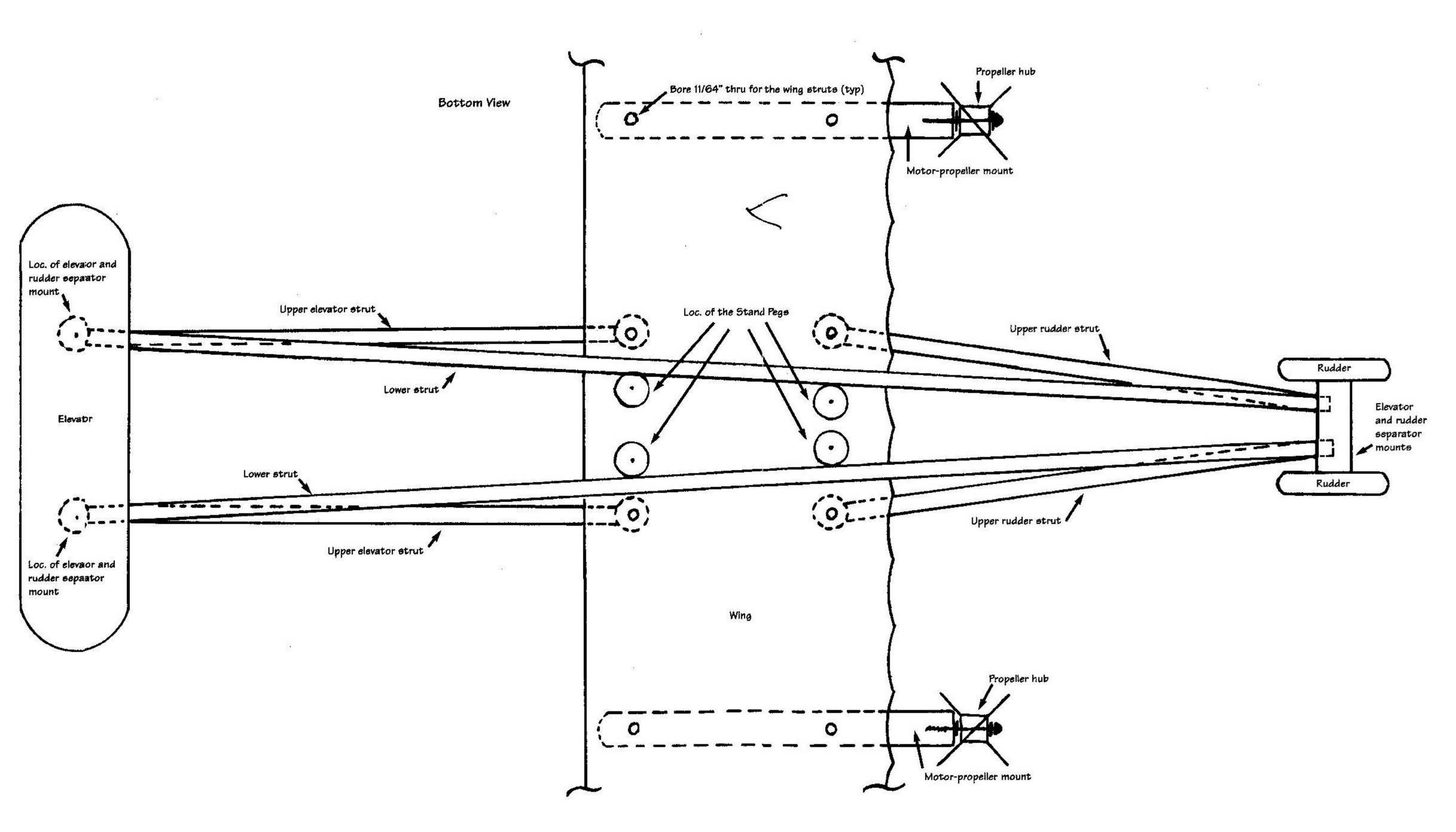


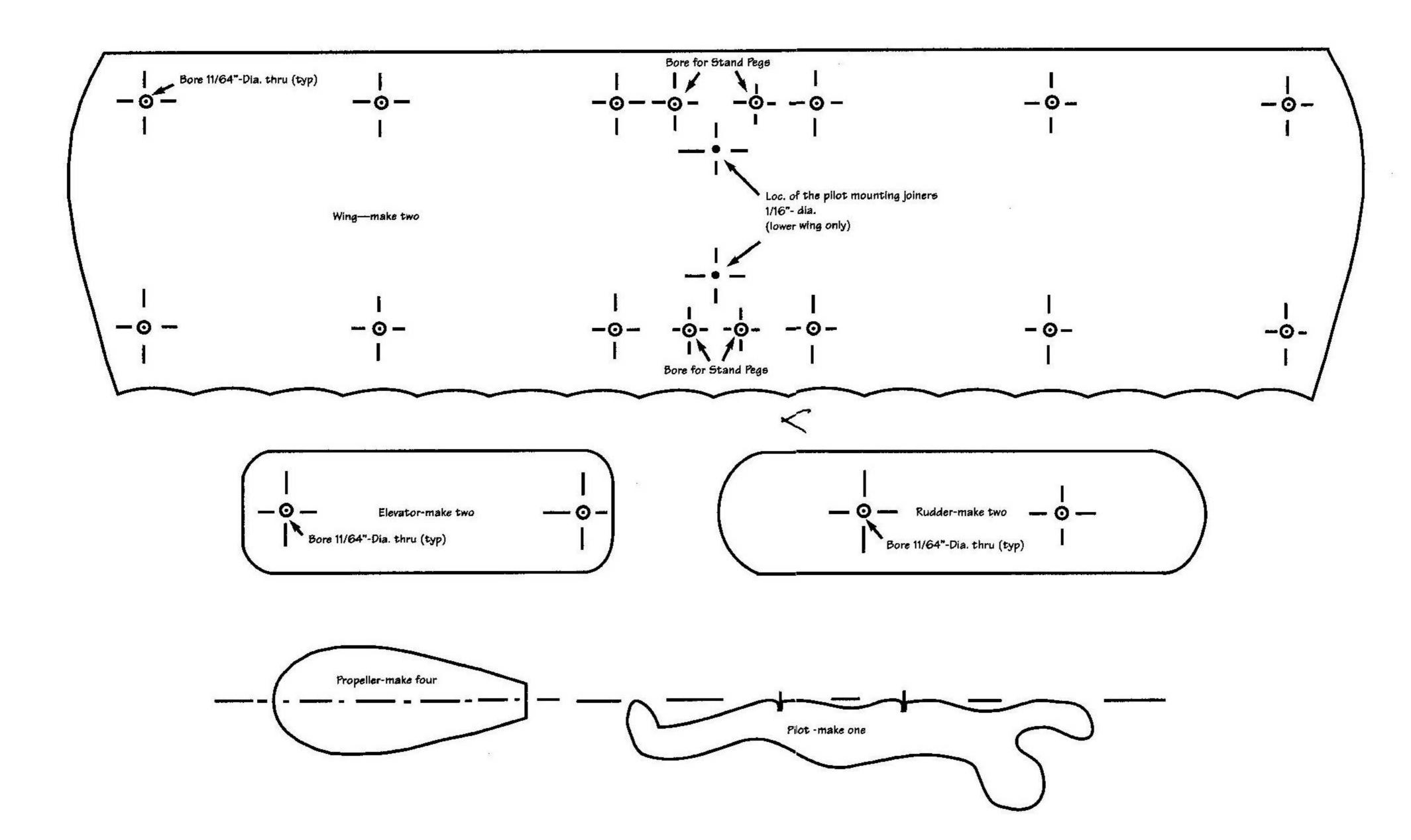


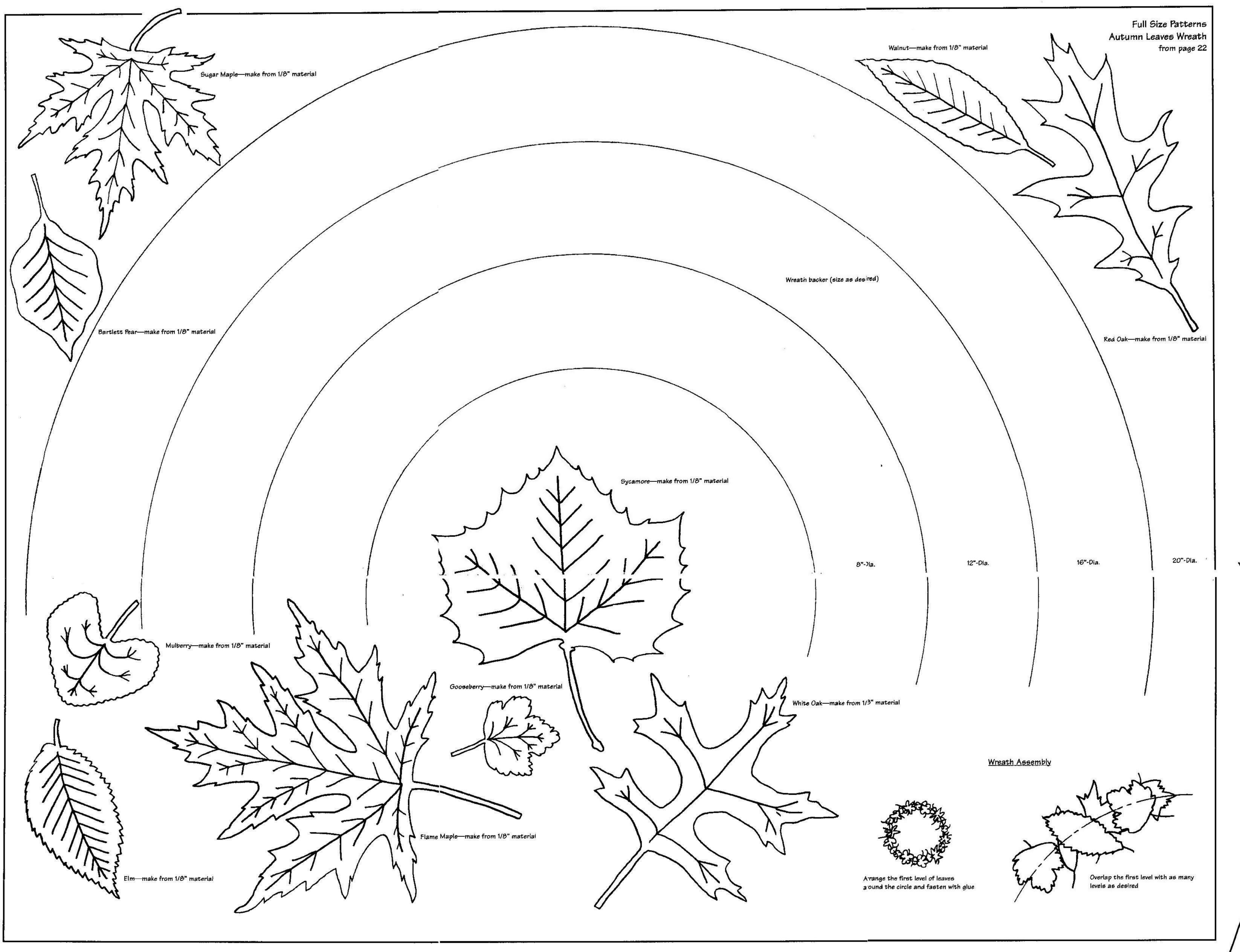


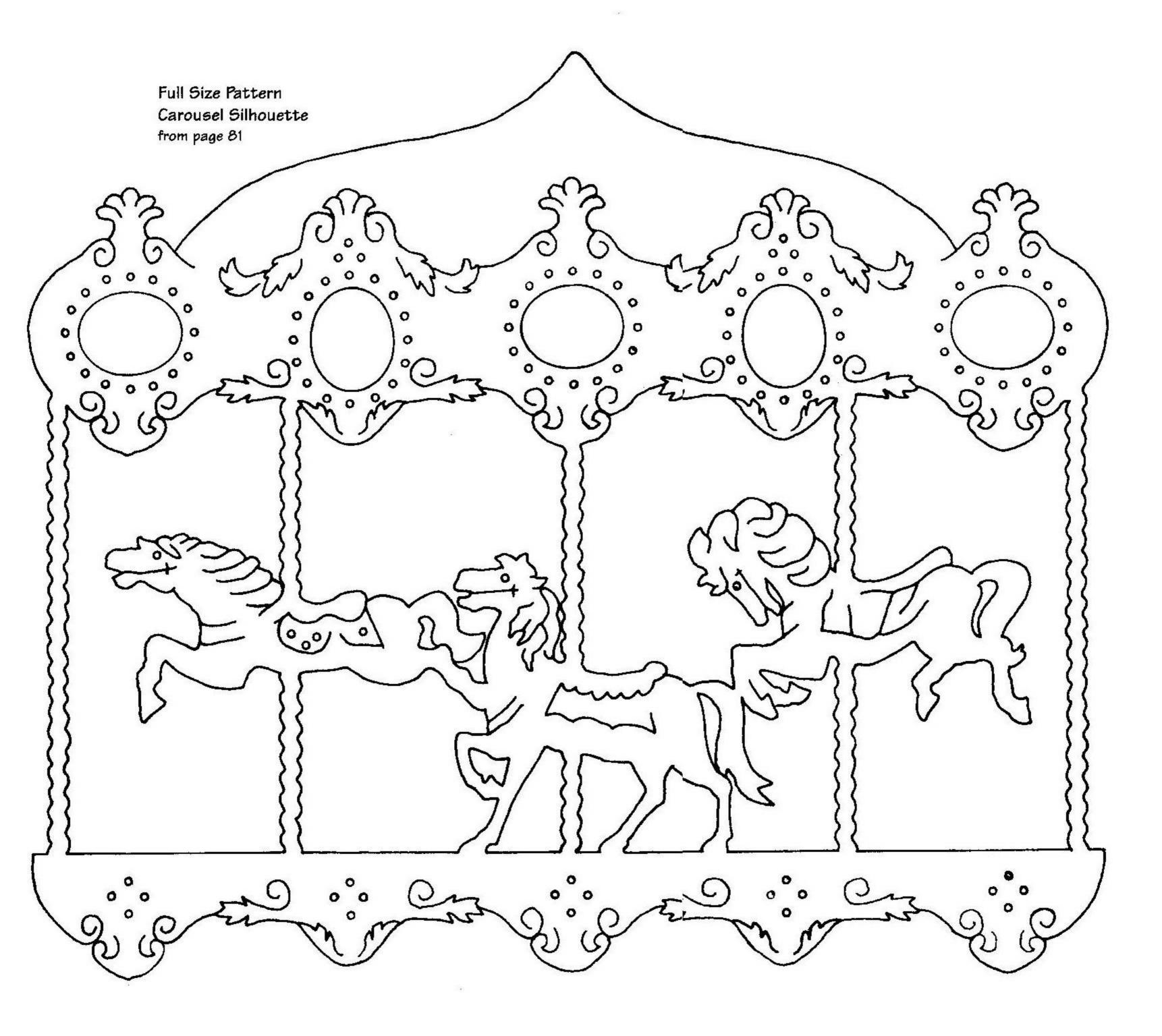


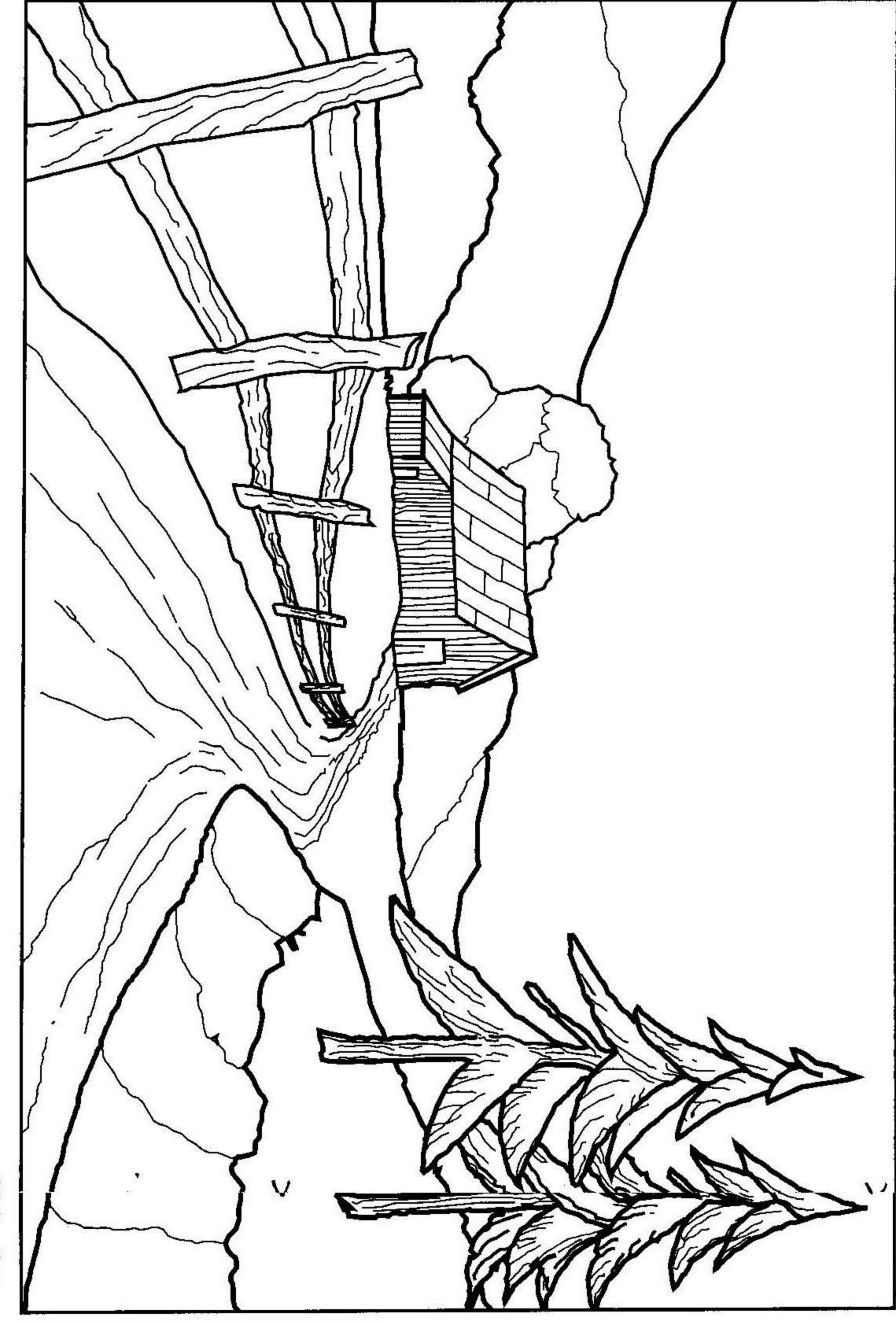




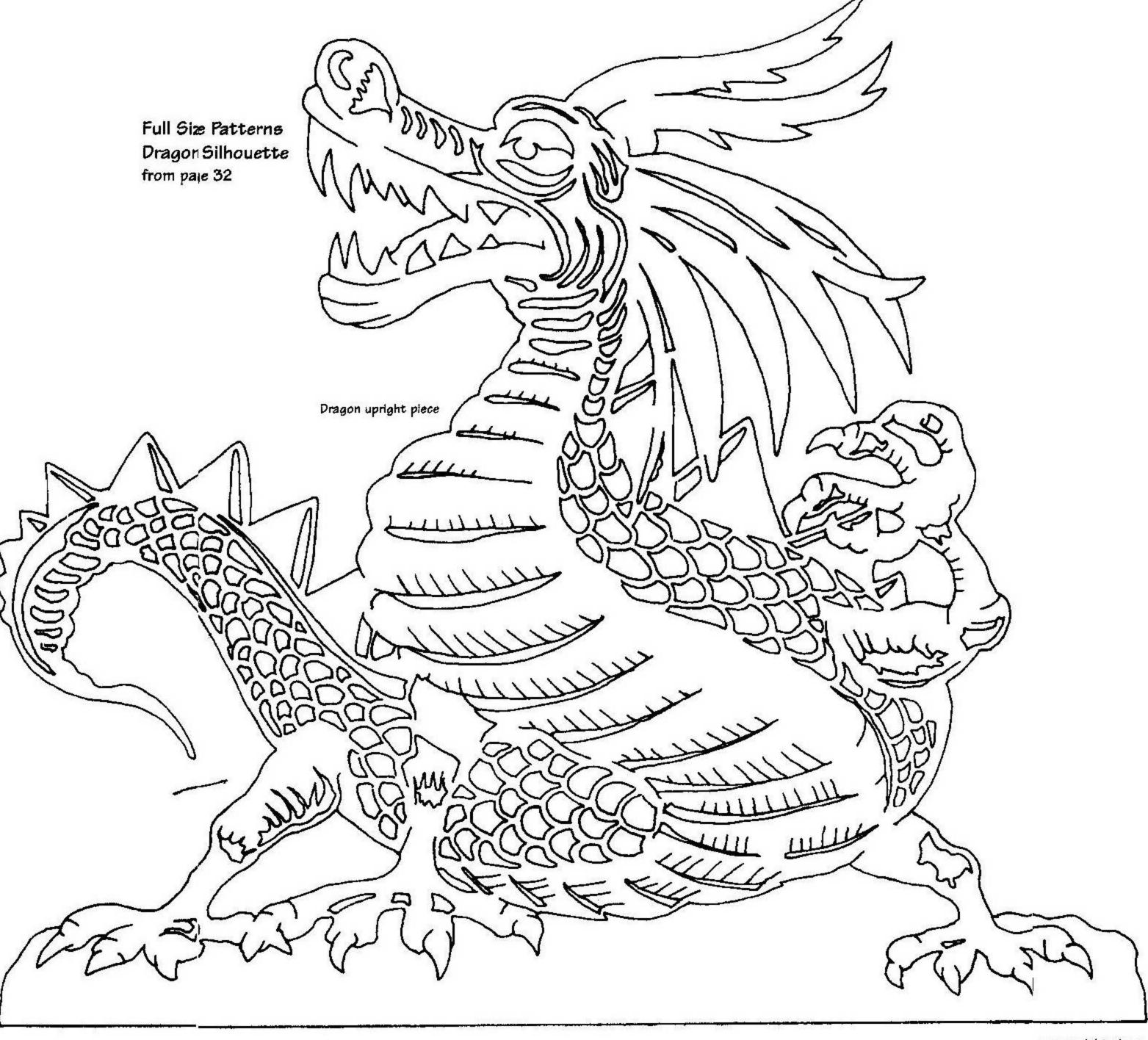


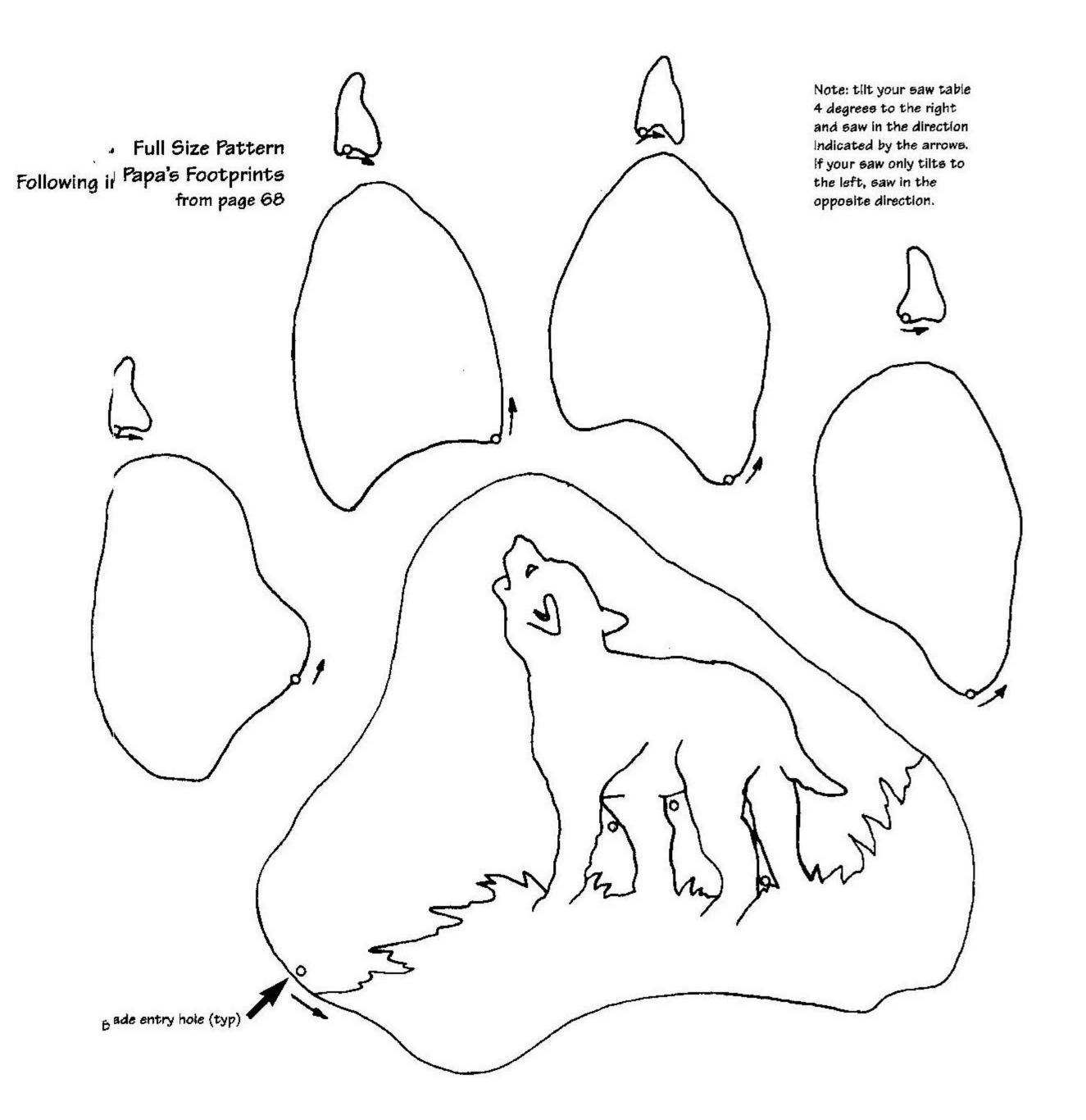


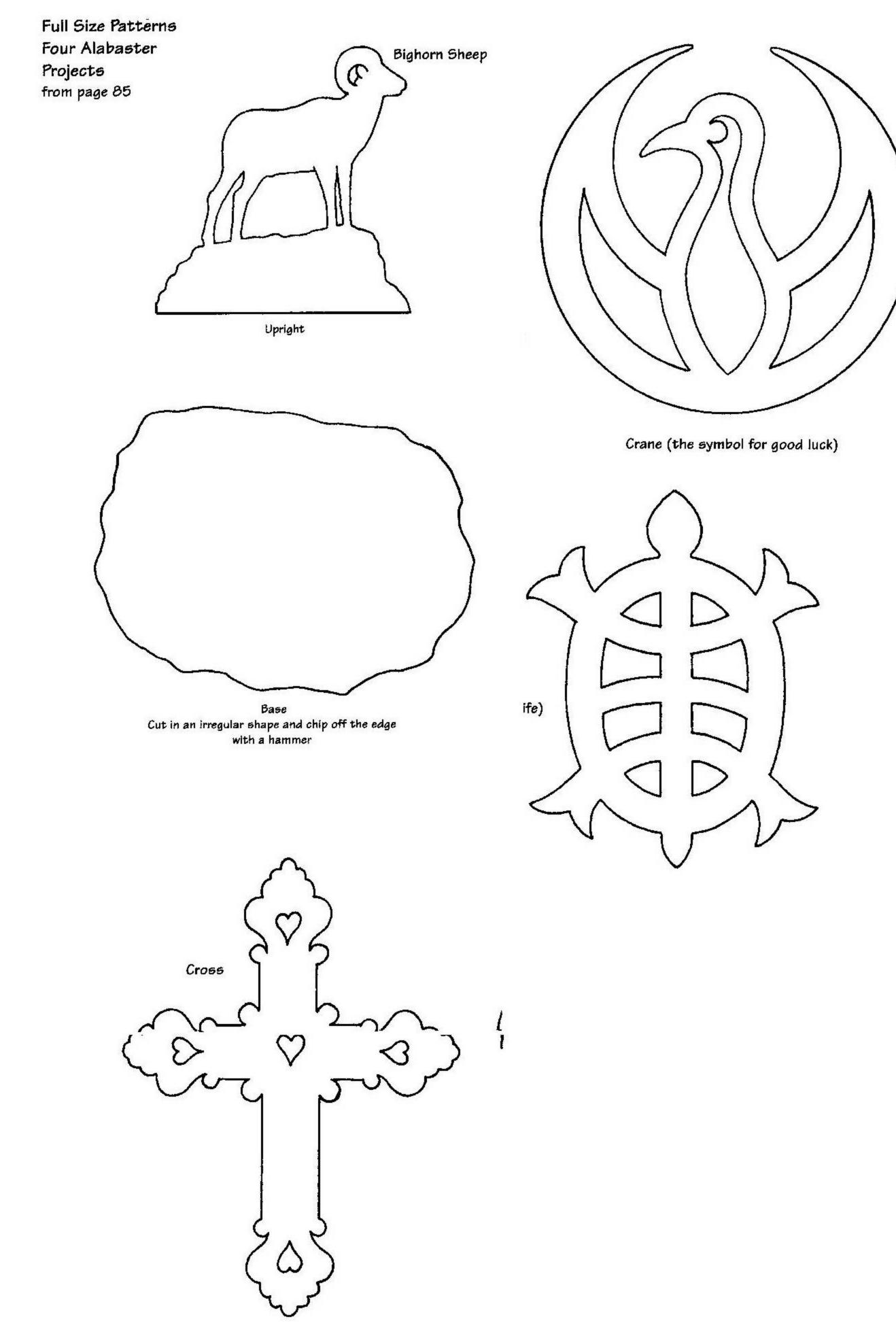




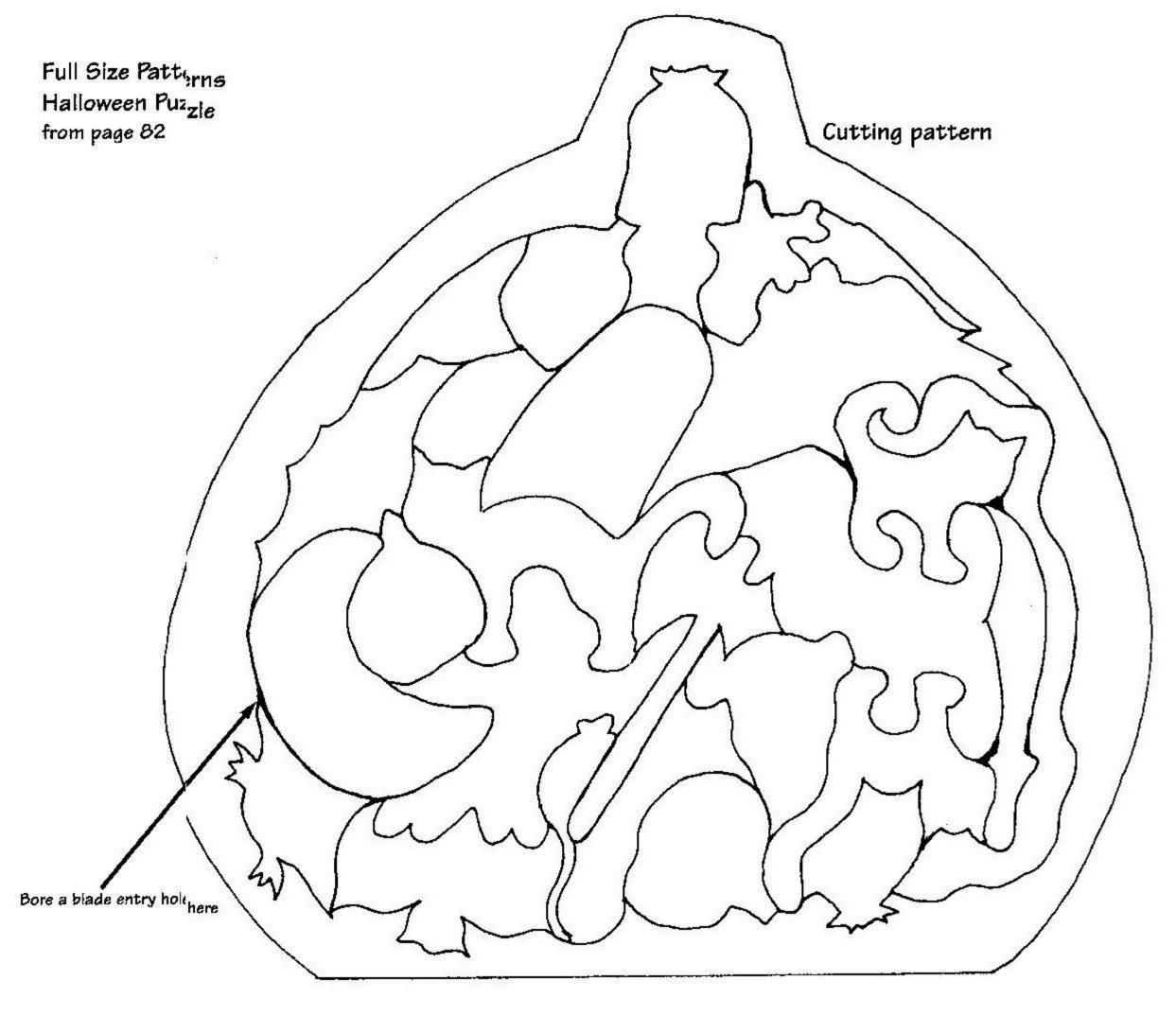
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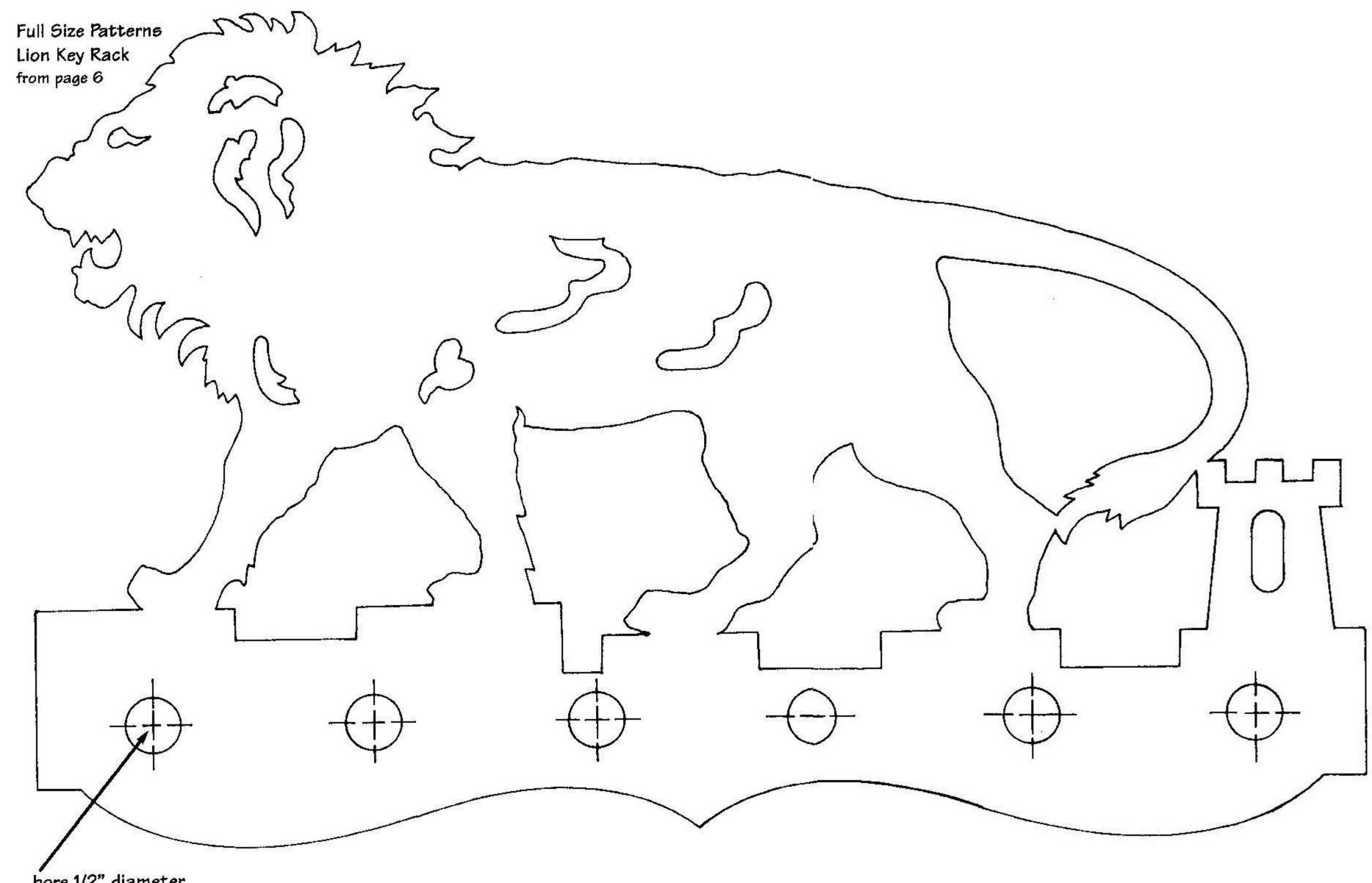




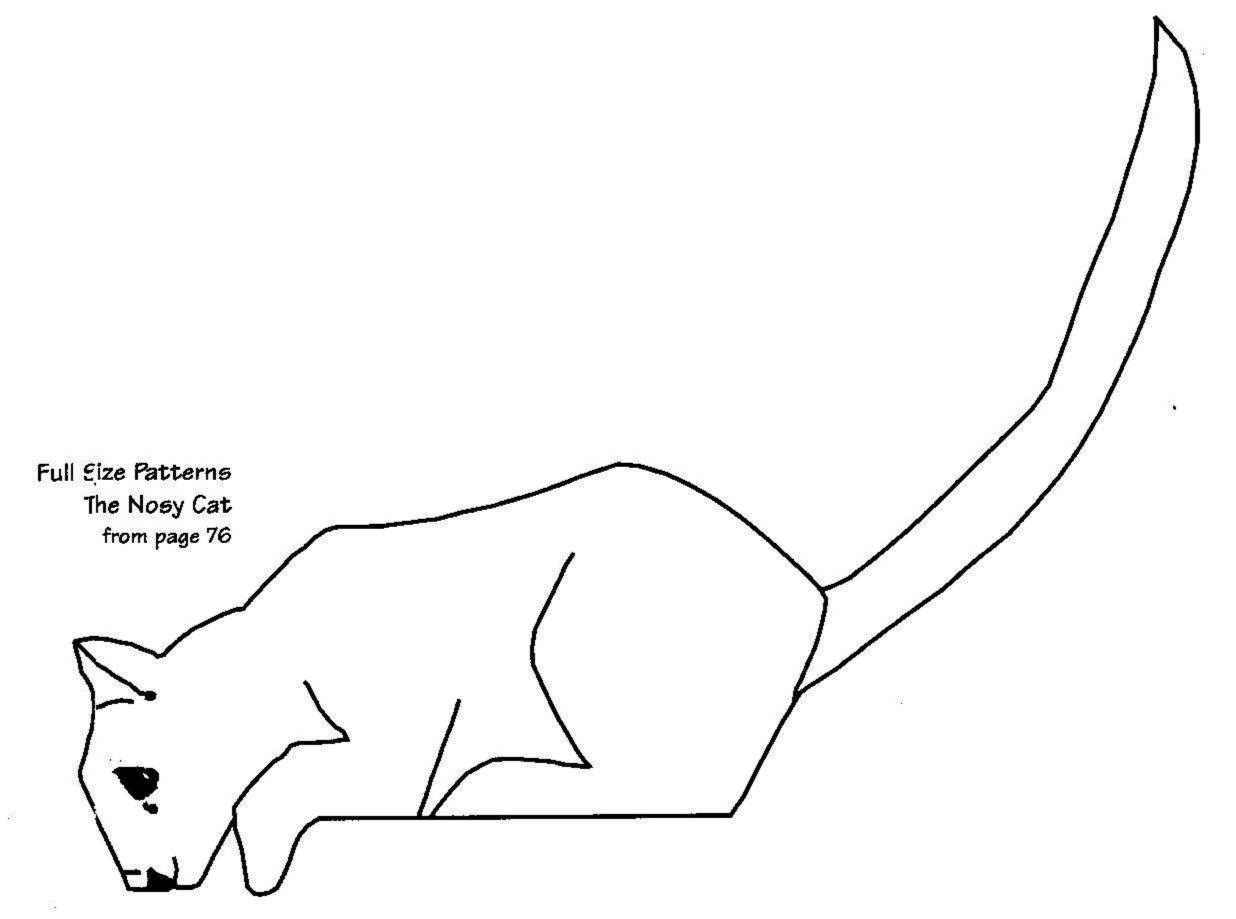


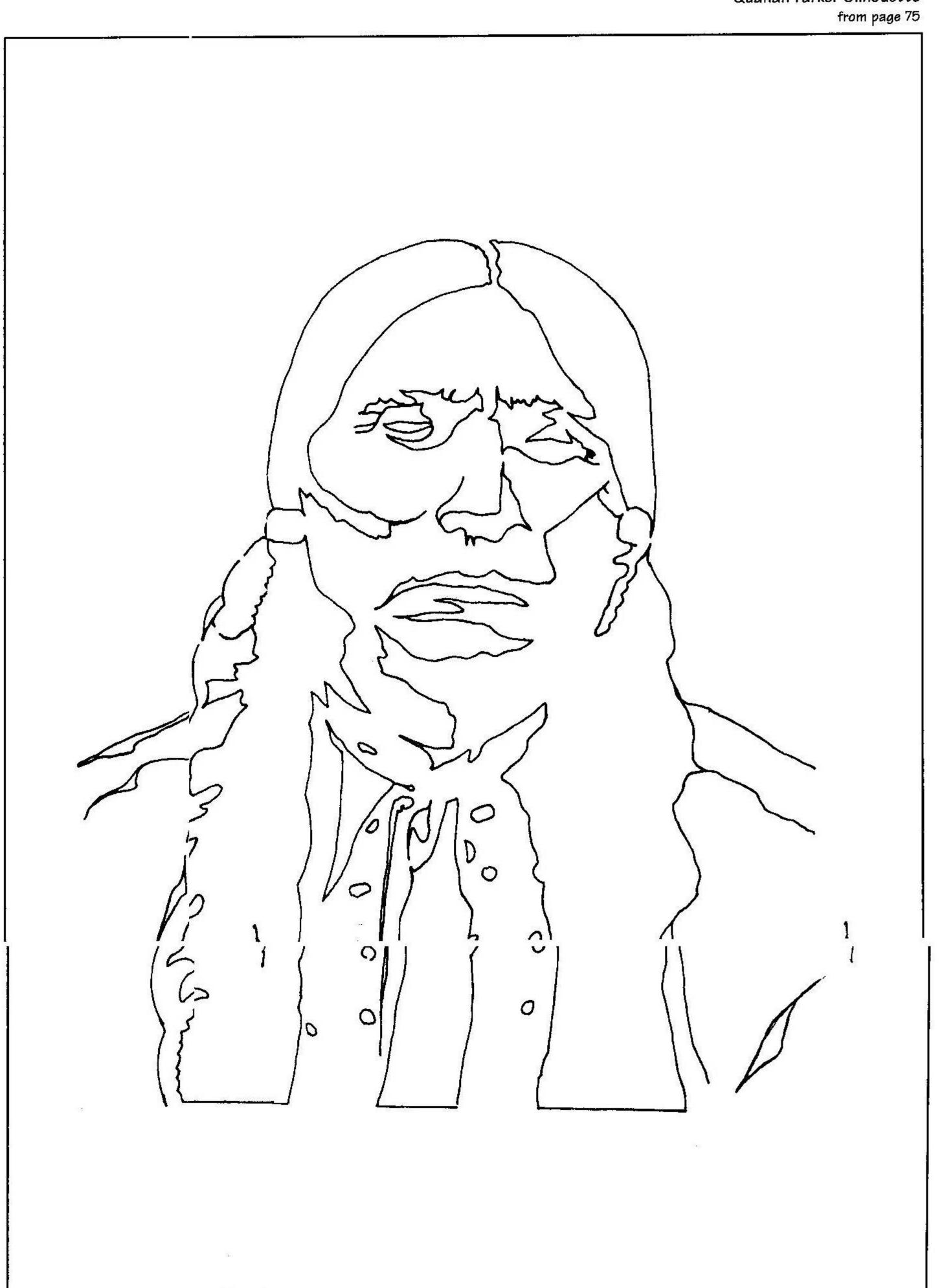


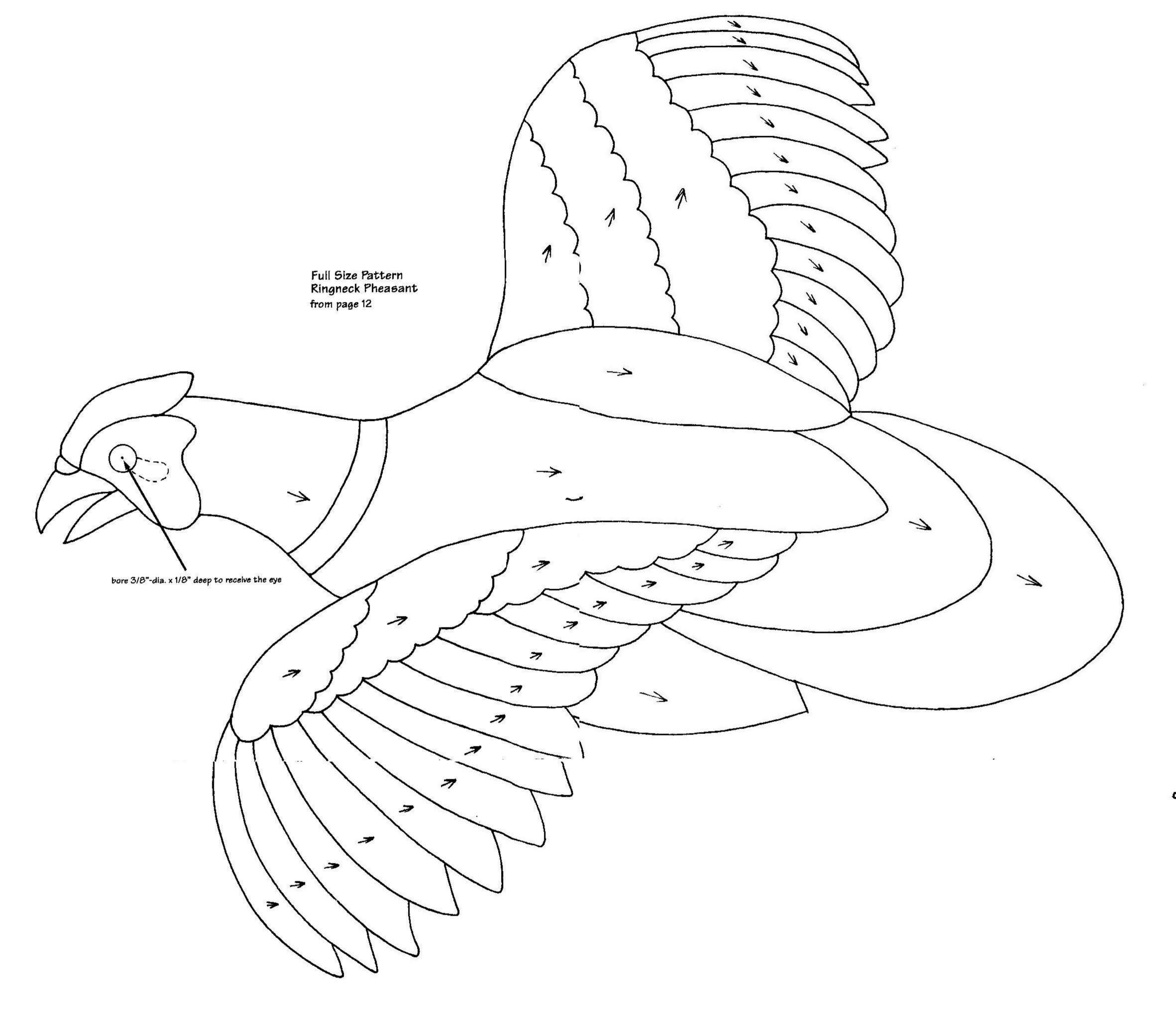


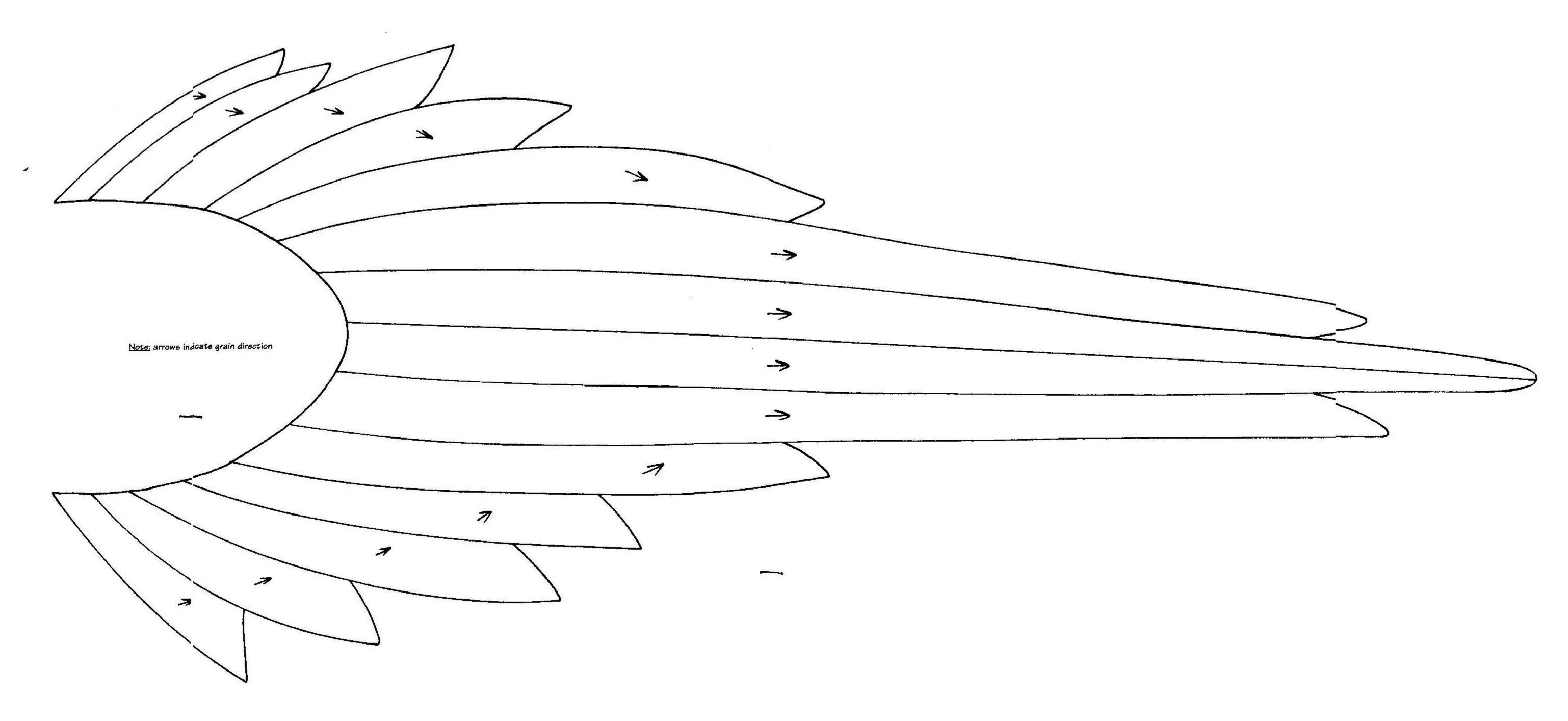


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